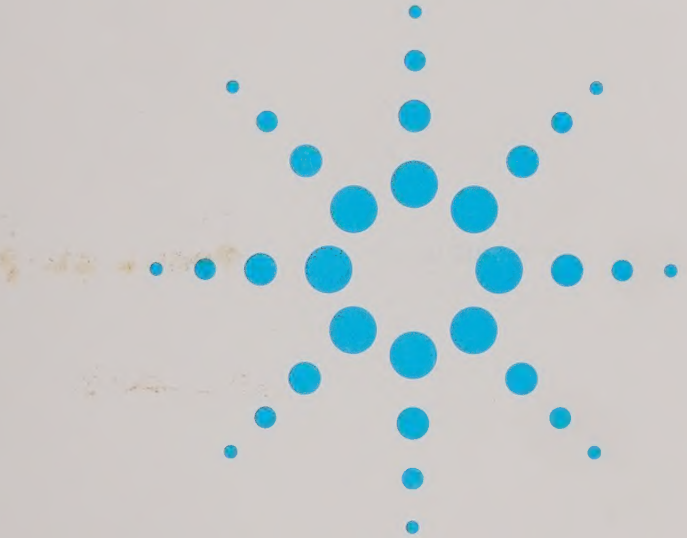
Agilent Technologies

Agilent IO Libraries (Version L.02.00)



Installation and Configuration Guide for Windows

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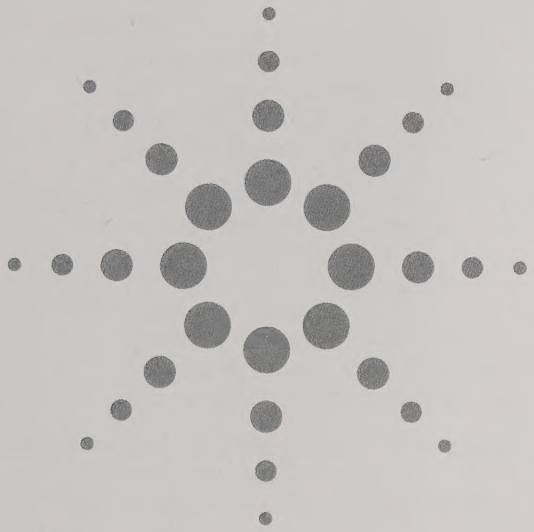

Installation and Configuration Guide for Windows

Agilent Technologies

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Edition 7
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Support Information

Support information for the Agilent IO Libraries follows.

- You can reach Agilent Technologies at these telephone numbers:

  Americas Call Center: 1-800-452-4844
  Canada Call Center: 1-877-894-4414
  European Call Center: +31-20-547-9900
  Japan Call Center: +81-426-56-7832

- For other countries, contact your country's Agilent support organization. A list of contact information for other countries is available on the Agilent Internet site: `www.agilent.com/find/assist`. A list of other Agilent Websites follows.

URL	Description
`www.agilent.com/find/assist`	Agilent Technologies "Contact Us" page
`www.agilent.com/find/iolib`	Update the Agilent IO Libraries software
`www.agilent.com/find/iolib_support`	The latest customer support information
`www.agilent.com/find/ADN`	Connectivity resources all in one place
`www.agilent.com/find/manuals`	Technical support information, including manuals, application notes, FAQs, and software and firmware downloads
`www.agilent.com/find/connectivity`	For connection, communication and control of test instruments from your computer, you can find out the latest in the world of connectivity.

User Guide Information

This *Agilent IO Libraries Installation and Configuration Guide for Windows* shows how to install, configure, and maintain Agilent IO Libraries Version L.02.00 and earlier on Windows 95, Windows 98, Windows Me, Windows NT 4.0, Windows 2000, or Windows XP Professional operating systems.

NOTE

Although the Agilent IO Libraries may work on Windows XP Home, Agilent does not support and has not tested this operating system.

NOTE

This guide does not include instructions to install Agilent IO Libraries on HP-UX systems. For HP-UX system installation, see the Agilent IO Libraries Installation and Configuration Guide for HP-UX . Unless otherwise indicated, Windows NT refers to Windows NT 4.0.

Chapter	Description
Chapter 1 - Getting Started	Introduces the Agilent IO Libraries and shows steps to get started installing the libraries.
Chapter 2 - Installing the Agilent IO Libraries	Shows how to install, upgrade, and maintain Agilent IO Libraries
Chapter 3 - Agilent IO Libraries Description	Describes the Agilent IO Libraries.
Chapter 4 - Using IO Configuration Utilities	Shows how to use IO configuration utilities (such as IO Config and VISA Assistant) to configure IO interfaces
Chapter 5 - Configuring I/O Interfaces	Provides information on programming and configuring I/O interfaces
Chapter 6 - Agilent IO Libraries System Information	Includes details of Agilent IO Libraries system information, including general information, installation guidelines, application notes, and troubleshooting guidelines.

Accessing an Electronic Copy of This Guide

There are two ways you can access an electronic (.pdf) version of this guide, as follows. You will need Adobe Acrobat Reader Version 3.0 or later to view the electronic version.

- **Access from the IO Control.** After the Agilent IO Libraries are installed, a blue IO icon appears on the right hand side of the Windows toolbar. To access an electronic version of this guide, click the IO icon, then click **View Documentation** and then click **IO Libraries Installation Guide**.

- **Access from the Web.** On your Web browser address line, type: `www.agilent.com/find/manuals` and navigate to the IO Libraries manual.

Related Documentation

Suggested documentation you can use for Agilent IO Libraries for Windows operation follows. After the Agilent IO Libraries have been installed on your PC, .pdf files of the Agilent IO Libraries, VISA, and SICL User's Guides are available. Click the blue IO icon on the Windows taskbar and then click **View Documentation**.

Product	Related Documentation
VISA	To develop and use VISA applications, see the *Agilent VISA User's Guide.*
SICL	To develop and use SICL I/O applications, see the *Agilent SICL User's Guide for Windows.*
Programmer's Toolkit	To develop programs in Visual Studio.Net, see the *Agilent T&M Programmer's Toolkit for Visual Studio.NET*

Notes:

1

Getting Started

Getting Started

This chapter shows suggested steps to get started installing the Agilent IO Libraries on PCs with Windows 98, Windows Me, Windows NT 4.0, Windows 2000, or Windows XP Professional operating systems., including:

- Introducing the Agilent IO Libraries
- Pre-Installation Checks

Introducing the Agilent IO Libraries

This section introduces the Agilent IO Libraries, including IO Libraries components and steps to use the libraries.

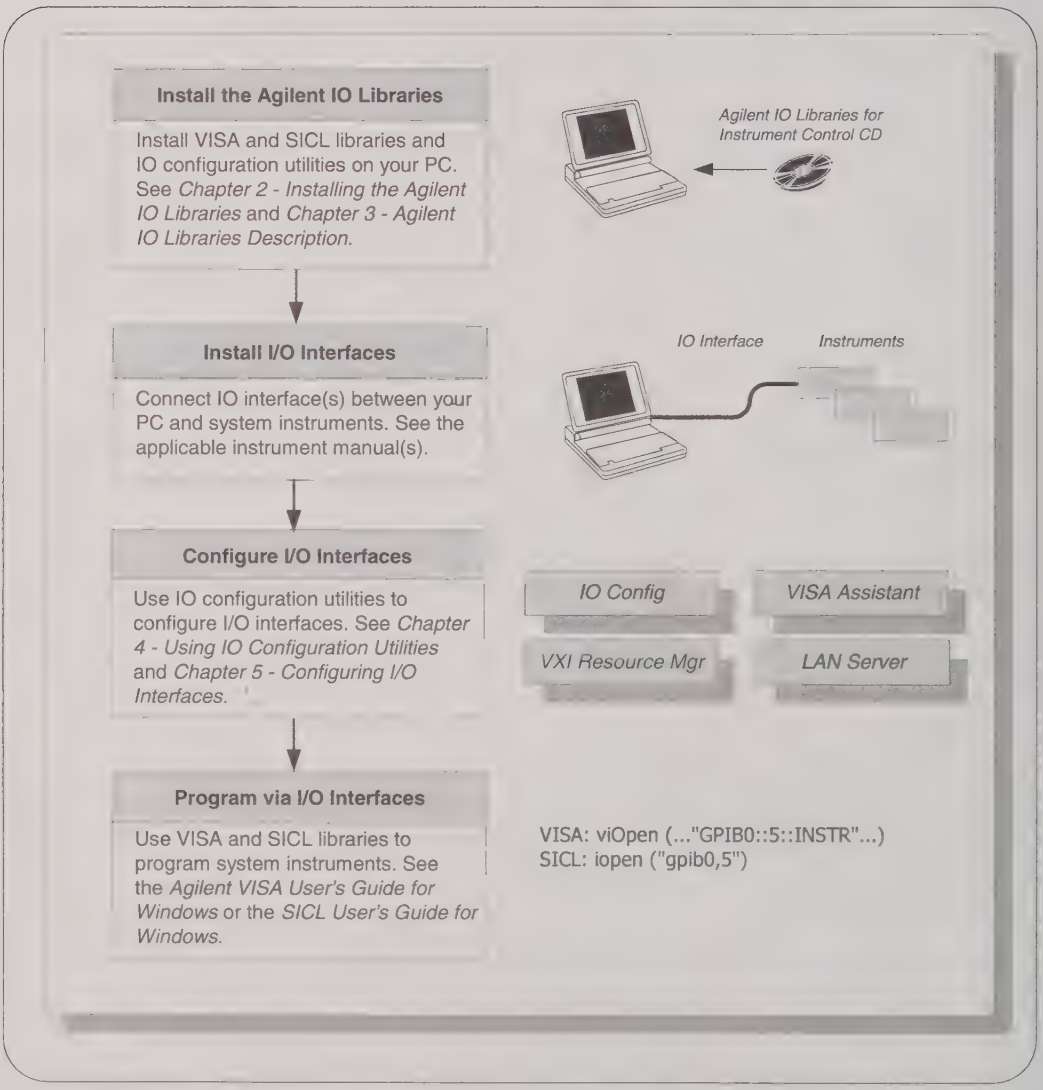
IO Libraries Components

The Agilent IO Libraries software consists of two libraries and four IO configuration utilities plus an IO Libraries Control, as shown. See *Chapter 3 - Agilent IO Libraries Description* for a full description of the Libraries.

IO Libraries	
Agilent VISA	*Agilent Virtual Instrument Software Architecture* (VISA) is an IO library that can be used to develop I/O applications and instrument drivers that comply with the VXI*plug&play* standards.
Agilent SICL	*Agilent Standard Instrument Control Library* (SICL) is an IO library developed by Agilent that is portable across many I/O interfaces.
IO Configuration Utilities	
IO Config	The IO Config utility is used by the Agilent IO Libraries to configure instrument I/O hardware interfaces. An interface must be configured with IO Config before it can be used with the Agilent IO Libraries.
VISA Assistant	VISA Assistant is an application program that can be used to control and communicate with VXI, GPIB, and Serial instruments.
VXI Resource Manager	If your system includes an E8491 IEEE-1394 PC Link to VXI interface, you can view the output of the VXI Resource Manager to determine if your system is properly configured.
LAN Server	If you configured the LAN server on your system using IO Config, you must start the LAN server before it can be used.
Agilent IO Libraries Control (blue IO Icon on the Windows Taskbar)	
Clicking the blue IO icon allows you to:	■ Run the VISA Assistant IO configuration utility ■ Run the IO Config utility ■ Display online (.pdf) documentation ■ Run the Windows Event Viewer ■ Select Agilent VISA Options ■ Hide the Icon or Exit ■ View the Version of the Agilent IO LIbraries

Steps to Use the Agilent IO Libraries

The following figure shows a suggested sequence to use the Agilent IO Libraries.


Install the Agilent IO Libraries
Install VISA and SICL libraries and IO configuration utilities on your PC. See *Chapter 2 - Installing the Agilent IO Libraries* and *Chapter 3 - Agilent IO Libraries Description.*
Agilent IO Libraries for Instrument Control CD
Install I/O Interfaces
Connect IO interface(s) between your PC and system instruments. See the applicable instrument manual(s).
IO Interface
Instruments
Configure I/O Interfaces
Use IO configuration utilities to configure I/O interfaces. See *Chapter 4 - Using IO Configuration Utilities* and *Chapter 5 - Configuring I/O Interfaces.*
IO Config
VISA Assistant
VXI Resource Mgr
LAN Server
Program via I/O Interfaces
Use VISA and SICL libraries to program system instruments. See the *Agilent VISA User's Guide for Windows* or the *SICL User's Guide for Windows.*
VISA: viOpen (..."GPIB0::5::INSTR"...)
SICL: iopen ("gpib0,5")

Pre-Installation Checks

Before you install the Agilent IO Libraries on your PC, you should:

- Check System Requirements
- Create an Emergency Repair Disk
- Check for Installed IO Libraries

Checking System Requirements

See the following table to verify that your system meets the minimum requirements and that your system interfaces are supported. This table summarizes **minimum** hardware and software requirements to install and use the Agilent IO Libraries. Adding additional RAM may improve overall system performance.

Item	Minimum Requirements
Hardware Requirements	
PC Operation/Memory	100 MHz operation and 64 Mb RAM
PC Plug-in Slots	EISA I/O slots for GPIB or RS-232 interface or for a LAN adapter. PCI slots for GPIB (PCI) and IEEE-1394 interfaces.*
Software Requirements	
Operating System	Windows 98/Me/2000/NT/XP Professional
IO Library Installation Sizes	- Core Installation (LAN and ASRL only) 5 Mb - Runtime Installation (adds hw drivers) 9 Mb - Full Installation (without manuals) 14 Mb - Full Installation (with manuals) 34 Mb - Add Adobe Acrobat Reader (version 5.05) 11 Mb addl

*If you use an RS-232 interface with VISA and SICL, see the RS-232 documentation for your Windows product, since VISA and SICL use the RS-232 capabilities built into Windows.

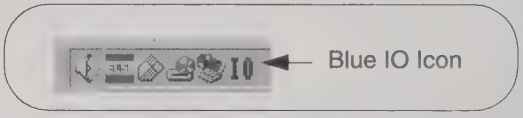
Creating an Emergency Repair Disk

The Agilent IO Libraries include IO drivers for various PCI plug-in cards. Extensive testing of these drivers and cards has revealed that early revisions of the BIOS code in several PCs are not completely PCI-compliant. This has caused problems when running the Agilent IO Libraries, whether or not the PCI card is installed. Problems can include system errors, operating system crashes, or card initialization failures.

For Windows NT operating systems, most PC manufacturers recommend that before installing any PCI card, you first create an EMERGENCY REPAIR DISK. If your PC exhibits any abnormal behavior following installation of the Agilent IO Libraries, we recommend a BIOS upgrade to the PC. BIOS upgrades are available from most PC manufacturers' websites.

Checking for Installed Agilent IO Libraries

If a version of the Agilent IO Libraries has been installed, a blue IO icon may be displayed on the Windows taskbar. If so, click the icon and click **About Agilent IO Libraries Control** to display the installed version.



- If the IO icon is not displayed, a version may still be installed. To check this, click **Start | Programs** and look for the Agilent IO Libraries program group.
- If this group is displayed, click **Agilent IO Libraries | IO Control** to display the IO icon. Then, click the icon and select **About Agilent IO Libraries Control** to display the installed version.
- If the Agilent IO Libraries program group is missing or empty, no Agilent IO Libraries are installed.

If a version of the Agilent IO Libraries is installed, go to "Upgrading Existing Libraries" in *Chapter 2 - Installing the Agilent IO Libraries*. If no Agilent IO Libraries are installed, go to "Selecting the Type of Installation" in Chapter 2.

2

Installing the Agilent IO Libraries

Installing the Agilent IO Libraries

This chapter shows how to install the Agilent IO Libraries on PCs with Windows 98, Windows Me, Windows NT 4.0, Windows 2000, or Windows XP Professional operating systems. Chapter contents are:

- Selecting the Type of Installation
- Installing a Full Version of New Libraries
- Installing a Runtime Version of New Libraries
- Installing a Custom Version of New Libraries
- Upgrading Existing Libraries
- Maintaining Existing Libraries

Selecting the Type of Installation

For new Agilent IO Libraries, you can install a full version, a runtime version, or a custom version of the libraries. See the following table for guidelines to choose an installation option.

NOTE

If another vendor's VISA is detected during installation, Agilent VISA will be installed as a secondary (side-by-side) VISA to the other vendor's VISA. In this case, the other vendor's VISA will be the primary VISA.

This means your applications may not be able to access instruments, as applications normally link to the primary VISA. However, some Agilent VISA utilities such as **`vifind32.exe`** *and* **`VISA Assistant`** *use Agilent VISA even if another vendor's VISA is installed as primary VISA.*

If another vendor's VISA is installed and you want to make Agilent VISA the primary VISA, you must select a Custom Installation.

Option	Description	See:
Full Installation	Installs SICL and Agilent VISA as primary VISA with the default options for your computer configuration. Installing this option allows development and runtime capabilities using SICL and Agilent VISA for all supported interfaces.	"Installing a Full Version of New Libraries"
Runtime Installation	Install SICL and runtime Agilent VISA as primary VISA with the default options for your computer configuration. This option allows runtime capabilities (not program development) using SICL and Agilent VISA for all supported interfaces.	"Installing a Runtime Version of New Libraries"
Custom Installation	Allows you to select a custom installation of Agilent IO Libraries components. Six options are available: 1. Full install with Agilent VISA as primary 2. Full install with Agilent VISA as secondary 3. Runtime install with Agilent VISA as primary 4. Runtime install with Agilent VISA as secondary 5. Install Agilent GPIB-VXI 6. Select individual components	"Installing a Custom Version of New Libraries"

Installing a Full Version of New Libraries

This section shows how to install a full version of new Agilent IO Libraries including:

- Installing the IO Libraries
- Installing IO Interfaces
- Configuring I/O Interfaces
- Programming via I/O Interfaces

Installing the IO Libraries

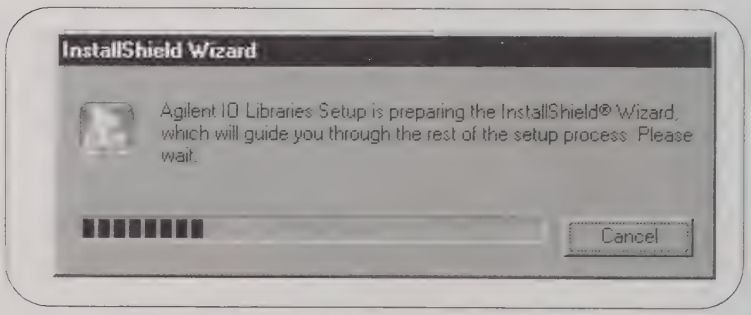
This section shows suggested steps to perform a full installation of new Agilent IO Libraries, when Agilent IO Libraries have **not** been installed on your PC. The full installation installs all library components with recommended options for your computer and is applicable for most applications.

1. Turn the PC ON and, as required, install application software such as C/C++, VEE, etc. on your PC.

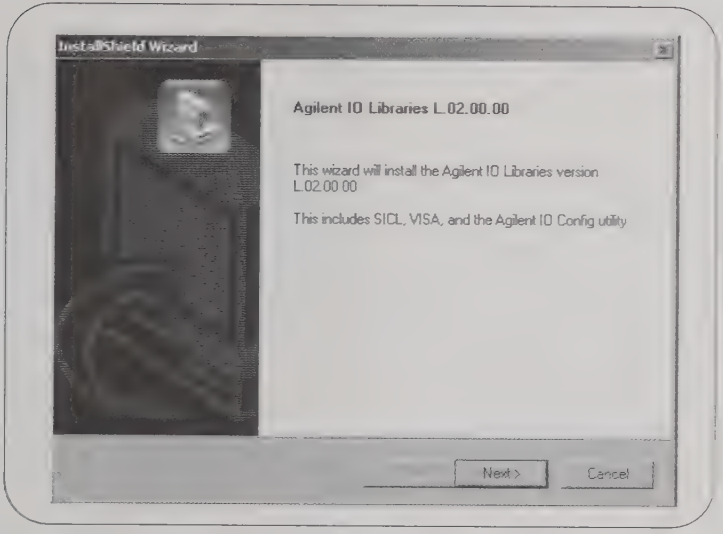
2. Insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

3. The installer should automatically start when the CD is inserted. If not, select **Start** | **Run** and type **<drive>:setup.exe**, where **drive** is your CD-ROM drive.

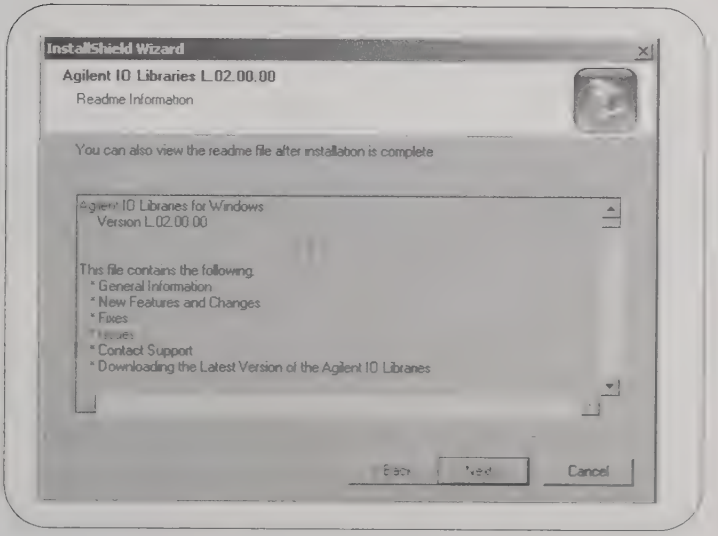
4. The InstallShield® Wizard appears to begin the Agilent IO Libraries installation.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

5 After a few seconds, the **Title Screen** appears.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
This wizard will install the Agilent IO Libraries version L.02.00.00
This includes SICL, VISA, and the Agilent IO Config utility
Next>
Cancel

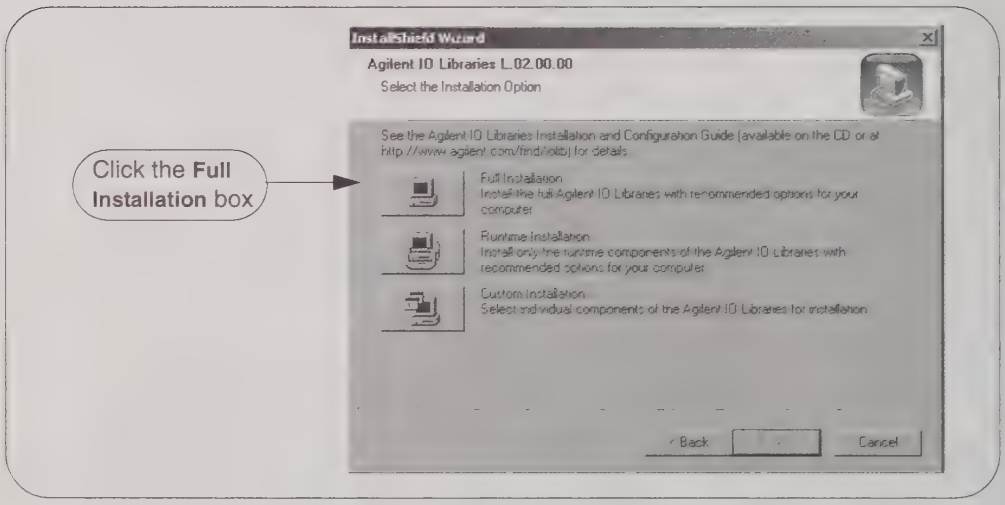
6 From the **Title Screen**, click **Next>** to go to the **License Agreement** screen and then click **Yes** to accept the license terms and to display the **Readme Information** screen.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Readme Information
You can also view the readme file after installation is complete
Agilent IO Libraries for Windows
Version L.02.00.00
This file contains the following:
* General Information
* New Features and Changes
* Fixes
* Issues
* Contact Support
* Downloading the Latest Version of the Agilent IO Libraries
Cancel

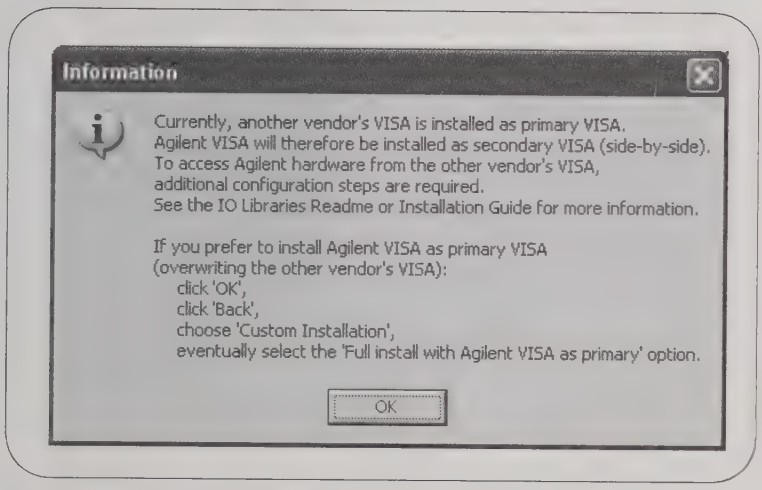
7 Scroll through the **Readme Information** screen to display the latest Agilent IO Libraries information.

- We highly recommend you read the **Readme Information** screen for the latest installation information before proceeding further with the installation.
- If you do not want to read the **Readme Information** screen at this time, after the Agilent IO Libraries are installed you can view the Readme information by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation** | **IO Libraries Readme**.

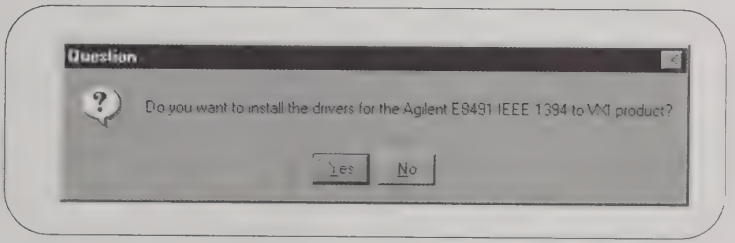
8 When finished with the **Readme Information** screen, click **Next>** to display the **Select the Installation Option** screen. Click the **Full Installation** box and then click **Next>**.


Click the **Full Installation** box
InstallShield Wizard
Agilent IO Libraries L.02.00.00
Select the Installation Option
See the Agilent IO Libraries Installation and Configuration Guide (available on the CD or at http://www.agilent.com/find/iolib) for details.
Full Installation
Install the full Agilent IO Libraries with recommended options for your computer
Runtime Installation
Install only the runtime components of the Agilent IO Libraries with recommended options for your computer
Custom Installation
Select individual components of the Agilent IO Libraries for installation
< Back
Cancel

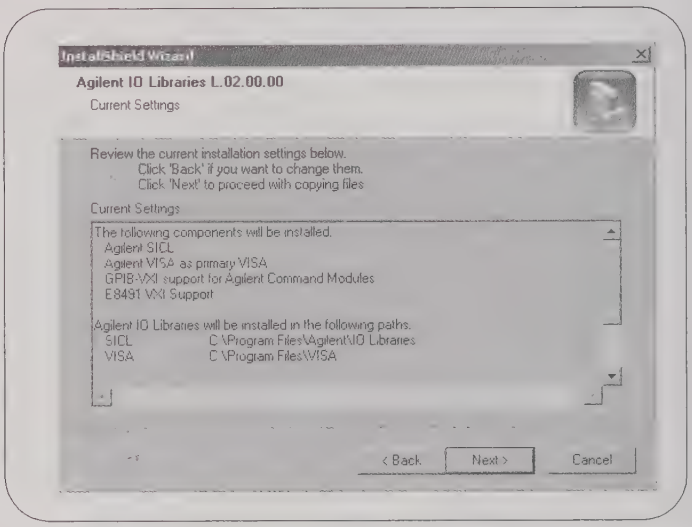
a If another vendor's VISA is currently installed, a side-by-side **Information** dialog box appears. If this dialog box appears, click **OK** to display the **Question** dialog box (for Windows NT 4.0 ONLY) (Step 8b) or to display the **Current Settings** dialog box (Step 9).


Information
Currently, another vendor's VISA is installed as primary VISA.
Agilent VISA will therefore be installed as secondary VISA (side-by-side).
To access Agilent hardware from the other vendor's VISA,
additional configuration steps are required.
See the IO Libraries Readme or Installation Guide for more information.
If you prefer to install Agilent VISA as primary VISA
(overwriting the other vendor's VISA):
click 'OK',
click 'Back',
choose 'Custom Installation',
eventually select the 'Full install with Agilent VISA as primary' option.
OK

b For Windows NT 4.0 ONLY, the **Question** dialog box appears. Click **Yes** to install the drivers, **No** to not install the drivers. For other operating systems, the E8491 drivers are automatically installed, so this this box does not appear.



9 The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files
Current Settings
The following components will be installed.
Agilent SICL
Agilent VISA as primary VISA
GPIB-VXI support for Agilent Command Modules
E8491 VXI Support
Agilent IO Libraries will be installed in the following paths.
SICL C:\Program Files\Agilent\IO Libraries
VISA C:\Program Files\VISA
< Back
Next >
Cancel

NOTE

If the side-by-side Information dialog box appears AND you want to set Agilent VISA as primary VISA, or if you want to change the settings listed, follow the instructions in "To Change the Settings." Otherwise, follow the instructions in "To Accept the Settings".

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 10).

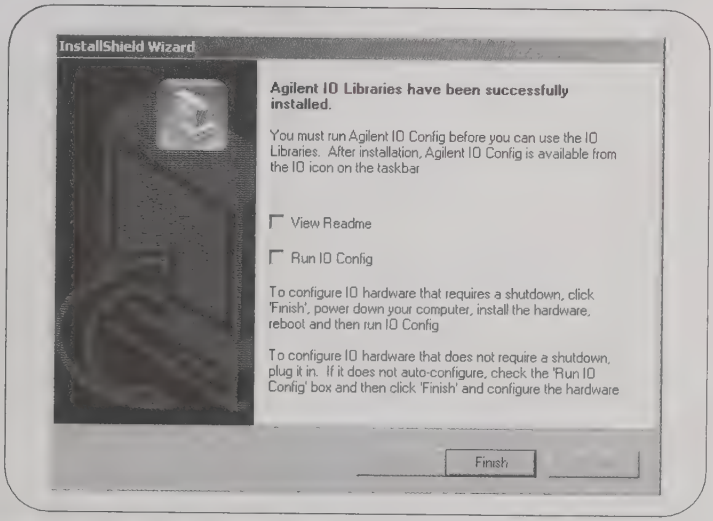
- **To Change the Settings.** To change the settings shown, click **<Back** to re-display the **Select the Installation Option** screen (see Step 8). From this screen, click the **Custom Installation** box and then click **Next>** to proceed with a custom installation. See "Installing a Custom Version of New Libraries".

Installing I/O Interfaces

10 As the last step in the Agilent IO Libraries installation, the **Agilent IO Libraries have been successfully installed** screen appears. Use the guidelines in the following table for the steps to install I/O interfaces.

NOTE

Before you click Finish to install the Agilent IO Libraries, complete Step 11, 12, 13, or 14 (as applicable) and Step 15 to install I/O interfaces.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar
View Readme
Run IO Config
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware, reboot and then run IO Config
To configure IO hardware that does not require a shutdown, plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware
Finish

Windows	Hardware	Use Step
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 13 and 14) that requires a shutdown for installation	11
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 13 and 14) that does not require a shutdown for installation	12
98/Me/2000/XP Pro	Agilent 1394 FireWire and E8491B VXI Interface cards	13*
98/Me/2000/XP Pro	Agilent 82350 PCI GPIB card	14*

* Do NOT use Steps 13 or 14 for Windows NT.

11 **If an I/O Interface Installation Requires Shutdown.** To install and configure I/O interfaces that require a power shutdown:

- **a** As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.
- **c** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **d** Power down your PC, install the I/O hardware, and reboot your PC.
- **e** Go to Step 15.

12 **If an I/O Interface Installation Does Not Require Shutdown.** To install and configure I/O interfaces that do not require a power shutdown:

- **a** Check the **View Readme** box (as desired) and check the **Run IO Config** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Connect the hardware to your PC and wait for an auto-configure action.
- **c** If the hardware does not auto-configure, click **Finish** to display the IO Config main screen. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is also displayed.
- **d** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **e** Go to Step 15.

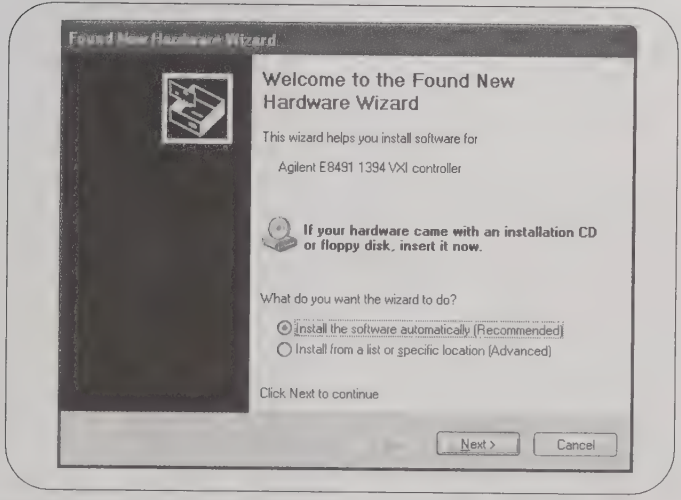
13 **For E8491B VXI Hardware Only.** To install and configure an Agilent 1394 FireWire Card connected to an E8491B VXI Interface card in a Windows 98/Me/2000/XP Professional operating system:

- **a** As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.
- **b** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down your PC and turn VXI mainframe power OFF.

d Install an IEEE-1394 FireWire card. Use a FireWire cable to connect the IEEE-1394 card to an E8491B VXI interface card in a VXI mainframe. Then, power up the mainframe and turn your PC ON.

e As Windows 98, Me, 2000, or XP Professional restarts, a **Found New Hardware Wizard** starts. Use the following table for the actions to take for each operating system. Then, go to Step 15.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for
Agilent E8491 1394 VXI controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue
Next >
Cancel

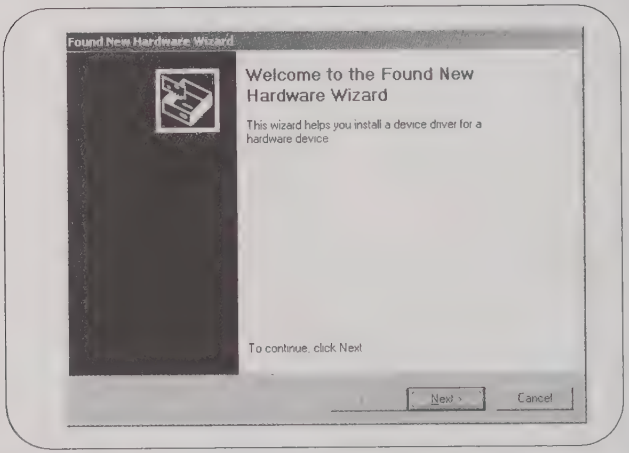
OS	Action
98	■ If the Wizard asks for the *1394bus.sys* file, provide the CD for the Windows 98 operating system and let the Wizard search for and install the file. ■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
Me	■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK.**
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

14 **For 82350 PCI GPIB Hardware Only.** To configure a Windows 98/Me/2000/XP Professional operating system that has an Agilent 82350 PCI GPIB Card installed in the PC:

a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation.
If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down the PC and install the 82350 in a PCI slot. Then, power up the mainframe and turn the PC ON. As Windows 98/Me/2000/XP Professional restarts, a **Found New Hardware Wizard** will start.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device
To continue, click Next
< Next >
Cancel

d Use the following table for the actions to take for each operating system. Then, go to Step 15.

OS	Action
98/Me	■ When the Wizard asks for the HPIOLibraries CD, click **OK.** ■ When the Wizard asks for the *hpioclas.dll* file, browse to C:\windows\system\ and click **OK.**
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

Configuring I/O Interfaces

15 To configure the I/O interfaces, run IO Config by clicking the blue IO icon and clicking **Run IO Config**. Follow the on-screen instructions to configure the interface. See *Chapter 4 - Using IO Configuration Utilities* for information on using IO Config.

Programming via I/O Interfaces

16 You can use VISA Assistant to communicate between your PC and instruments. See *Chapter 4 - Using IO Configuration Utilities* for information on VISA Assistant.

a To begin programming via the interface using Agilent VISA or SICL, see *Chapter 5 - Configuring I/O Interfaces*.

b For information on using Agilent VISA, see the *Agilent VISA User's Guide*. For information on SICL, see the *Agilent SICL User's Guide for Windows*. Both documents are available in electronic form by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation.**

Installing a Runtime Version of New Libraries

This section shows how to install a runtime version of new Agilent IO Libraries including:

- Installing the IO Libraries
- Installing IO Interfaces
- Configuring I/O Interfaces
- Programming via I/O Interfaces

NOTE

Installing the runtime version of the Agilent IO Libraries allows you to run previously developed applications that use VISA and SICL on all supported I/O interfaces. However, you cannot develop new applications using VISA and SICL when the runtime version is installed.

The advantage of using the runtime version is that it requires less hard drive space. For example, installing the full version requires about twice as much space as installing the runtime version. However, with the runtime version, no manuals, sample programs, or library files are installed.

Installing the IO Libraries

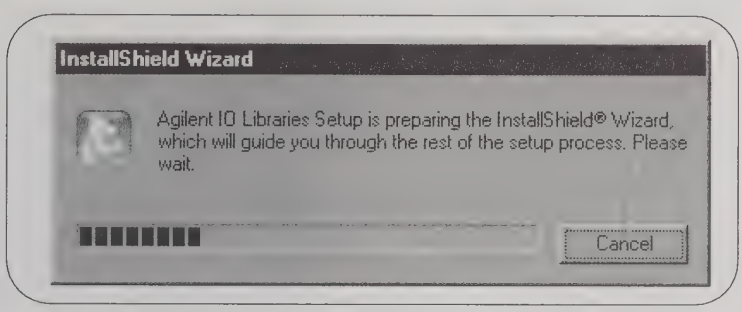
This section shows suggested steps to perform a full installation of new Agilent IO Libraries, when Agilent IO Libraries have **not** been installed on your PC. The full installation installs all library components with recommended options for your computer and is applicable for most applications.

1. Turn the PC ON and, as required, install application software such as C/C++, VEE, etc. on your PC.

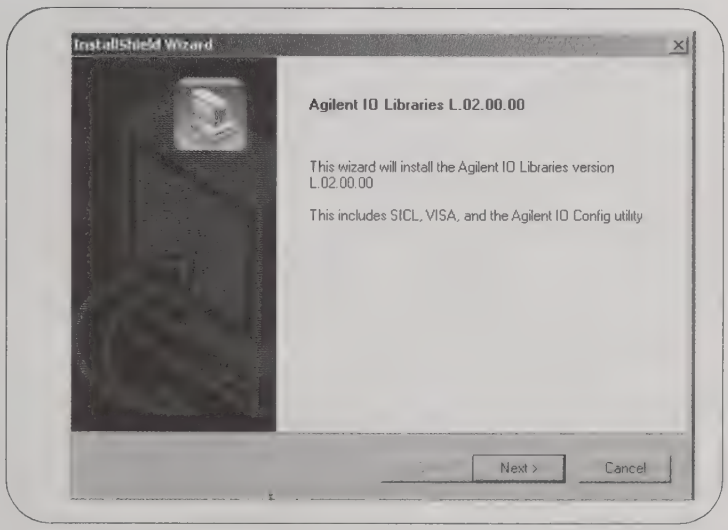
2. Insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

3. The installer should automatically start when the CD is inserted. If not, select **Start** | **Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

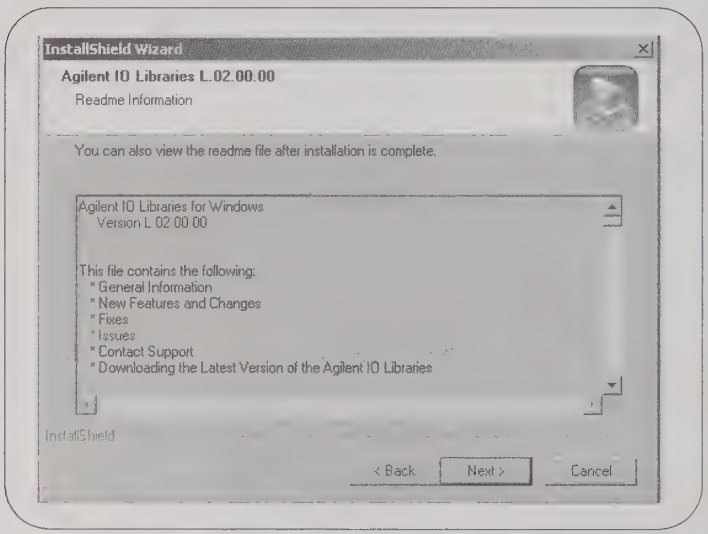
4 The InstallShield® Wizard appears to begin the Agilent IO Libraries installation.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

5 After a few seconds, the **Title Screen** appears.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
This wizard will install the Agilent IO Libraries version L.02.00.00
This includes SICL, VISA, and the Agilent IO Config utility
Next >
Cancel

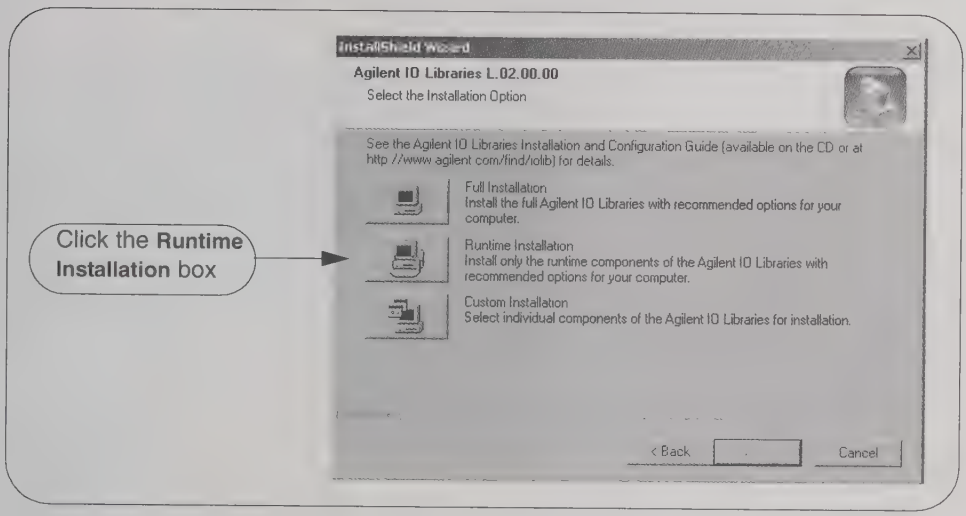
6 From the **Title Screen**, click **Next>** to go to the **License Agreement** screen and then click **Yes** to accept the license terms and to display the **Readme Information** screen.



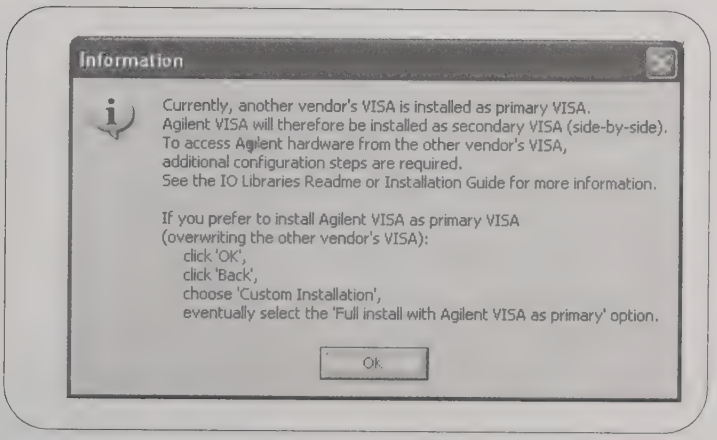
7 Scroll through the **Readme Information** screen to display the latest Agilent IO Libraries information.

- We highly recommend you read the **Readme Information** screen for the latest installation information before proceeding further with the installation.
- If you do not want to read the **Readme Information** screen at this time, after the Agilent IO Libraries are installed you can view the Readme information by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation** | **IO Libraries Readme**.

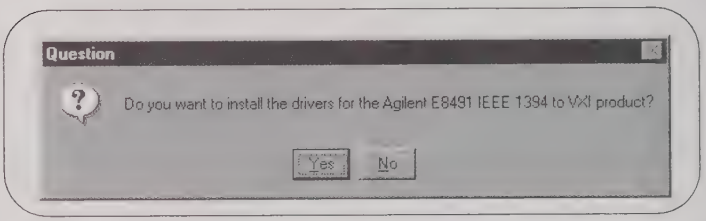
8 When finished with the **Readme Information** screen, click **Next>** to display the **Select the Installation Option** screen. Click the **Full Installation** box and then click **Next>**.


Click the **Runtime Installation** box
InstallShield Wizard
Agilent IO Libraries L.02.00.00
Select the Installation Option
See the Agilent IO Libraries Installation and Configuration Guide (available on the CD or at http://www.agilent.com/find/iolib) for details.
Full Installation
Install the full Agilent IO Libraries with recommended options for your computer.
Runtime Installation
Install only the runtime components of the Agilent IO Libraries with recommended options for your computer.
Custom Installation
Select individual components of the Agilent IO Libraries for installation.
< Back
Cancel

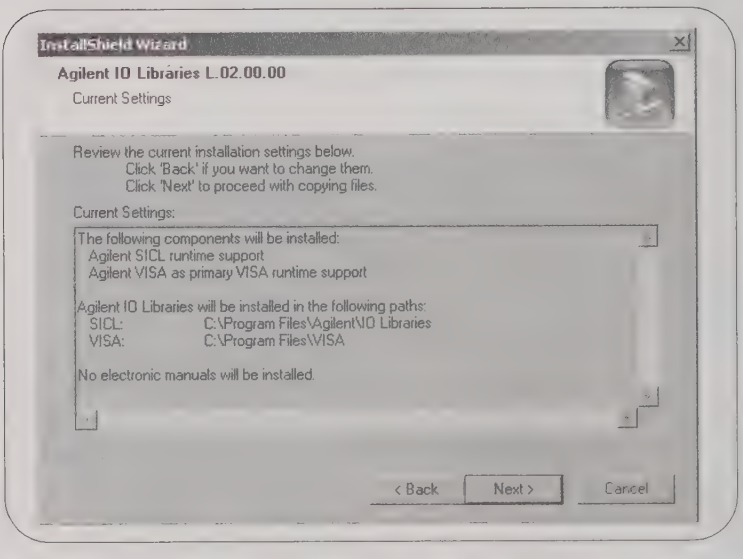
a If another vendor's VISA is currently installed, a side-by-side **Information** dialog box appears. If this dialog box appears, click OK to display the **Question** dialog box (for Windows NT 4.0 ONLY) (Step 8b) or to display the **Current Settings** dialog box (Step 9).


Information
Currently, another vendor's VISA is installed as primary VISA.
Agilent VISA will therefore be installed as secondary VISA (side-by-side).
To access Agilent hardware from the other vendor's VISA,
additional configuration steps are required.
See the IO Libraries Readme or Installation Guide for more information.
If you prefer to install Agilent VISA as primary VISA
(overwriting the other vendor's VISA):
click 'OK',
click 'Back',
choose 'Custom Installation',
eventually select the 'Full install with Agilent VISA as primary' option.
Ok

b For Windows NT 4.0 ONLY, the **Question** dialog box appears. Click **Yes** to install the drivers, **No** to not install the drivers. For other operating systems, the E8491 drivers are automatically installed, so this this box does not appear.



9 The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
The following components will be installed:
Agilent SICL runtime support
Agilent VISA as primary VISA runtime support
Agilent IO Libraries will be installed in the following paths:
SICL: C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
No electronic manuals will be installed.
< Back
Next >
Cancel

NOTE

If the side-by-side Information dialog box appears AND you want to set Agilent VISA as primary VISA, or if you want to change the settings listed, follow the instructions in "To Change the Settings." Otherwise, follow the instructions in "To Accept the Settings".

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 10).

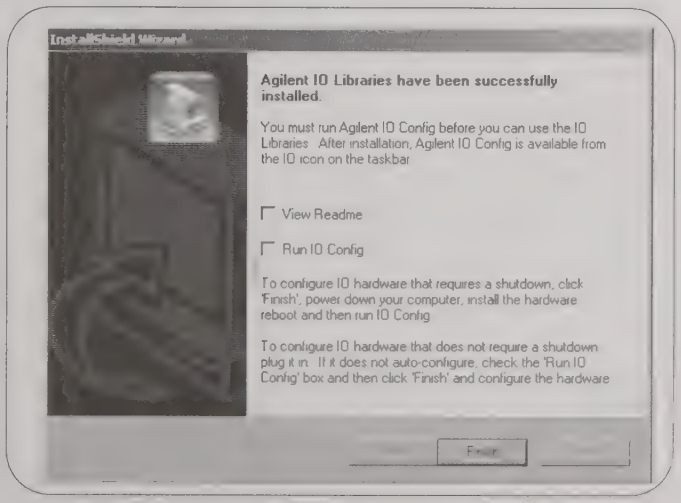
- **To Change the Settings.** To change the settings shown, click **<Back** to re-display the **Select the Installation Option** screen (see Step 8). From this screen, click the **Custom Installation** box and then click **Next>** to proceed with a custom installation. See "Installing a Custom Version of New Libraries".

Installing I/O Interfaces

10 As the last step in the Agilent IO Libraries installation, the **Agilent IO Libraries have been successfully installed** screen appears. Use the guidelines in the following table for the steps to install I/O interfaces.

NOTE

Before you click Finish to install the Agilent IO Libraries, complete Step 11, 12, 13, or 14 (as applicable) and Step 15 to install I/O interfaces.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar.
View Readme
Run IO Config
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware reboot and then run IO Config.
To configure IO hardware that does not require a shutdown plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware.
Finish

Windows	Hardware	Use Step
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 13 and 14) that requires a shutdown for installation	11
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 13 and 14) that does not require a shutdown for installation	12
98/Me/2000/XP Pro	Agilent 1394 FireWire and E8491B VXI Interface cards	13*
98/Me/2000/XP Pro	Agilent 82350 PCI GPIB card	14*

* Do NOT use Steps 13 or 14 for Windows NT.

11 **If an I/O Interface Installation Requires Shutdown.** To install and configure I/O interfaces that require a power shutdown:

- **a** As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.
- **c** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **d** Power down your PC, install the I/O hardware, and reboot your PC.
- **e** Go to Step 15.

12 **If an I/O Interface Installation Does Not Require Shutdown.** To install and configure I/O interfaces that do not require a power shutdown:

- **a** Check the **View Readme** box (as desired) and check the **Run IO Config** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Connect the hardware to your PC and wait for an auto-configure action.
- **c** If the hardware does not auto-configure, click **Finish** to display the IO Config main screen. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is also displayed.
- **d** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **e** Go to Step 15.

13 **For E8491B VXI Hardware Only.** To install and configure an Agilent 1394 FireWire Card connected to an E8491B VXI Interface card in a Windows 98/Me/2000/XP Professional operating system:

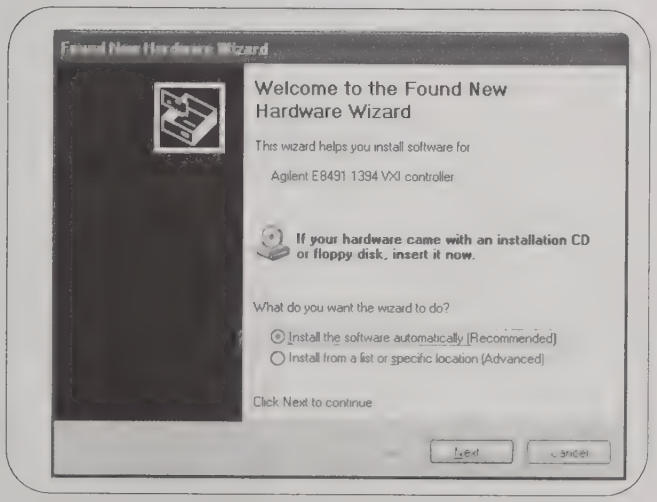
a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down your PC and turn VXI mainframe power OFF.

d Install an IEEE-1394 FireWire card. Use a FireWire cable to connect the IEEE-1394 card to an E8491B VXI interface card in a VXI mainframe. Then, power up the mainframe and turn your PC ON.

e As Windows 98, Me, 2000, or XP Professional restarts, a **Found New Hardware Wizard** starts. Use the following table for the actions to take for each operating system. Then, go to Step 15.


Welcome to the Found New Hardware Wizard
This wizard helps you install software for
Agilent E8491 1394 VXI controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue

OS	Action
98	■ If the Wizard asks for the *1394bus.sys* file, provide the CD for the Windows 98 operating system and let the Wizard search for and install the file. ■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
Me	■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

14 **For 82350 PCI GPIB Hardware Only.** To configure a Windows 98/Me/2000/XP Professional operating system that has an Agilent 82350 PCI GPIB Card installed in the PC:

a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed. Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

b Shut down the PC and install the 82350 in a PCI slot. Then, power up the mainframe and turn the PC ON. As Windows 98/Me/2000/XP Professional restarts, a **Found New Hardware Wizard** will start.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device
To continue, click Next

c Use the following table for the actions to take for each operating system. Then, go to Step 15.

OS	Action
98/Me	■ When the Wizard asks for the HPIOLibraries CD, click **OK**. ■ When the Wizard asks for the *hpioclas.dll* file, browse to C:\windows\system\ and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

Configuring I/O Interfaces

15 To configure the I/O interfaces, run IO Config by clicking the blue IO icon and clicking **Run IO Config**. Follow the on-screen instructions to configure the interface. See *Chapter 4 - Using IO Configuration Utilities* for information on using IO Config.

Programming via I/O Interfaces

16 You can use VISA Assistant to communicate between your PC and instruments. See *Chapter 4 - Using IO Configuration Utilities* for information on VISA Assistant.

a To begin programming via the interface using Agilent VISA or SICL, see *Chapter 5 - Configuring I/O Interfaces*.

b For information on using Agilent VISA, see the *Agilent VISA User's Guide*. For information on SICL, see the *Agilent SICL User's Guide for Windows*. Both documents are available in electronic form by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation**.

Installing a Custom Version of New Libraries

This section shows how to install a custom version of new Agilent IO Libraries, including:

- Installing the IO Libraries
- Installing IO Interfaces
- Configuring I/O Interfaces
- Programming via I/O Interfaces

Installing the IO Libraries

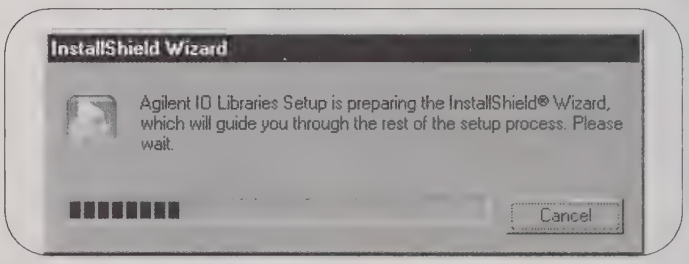
This section shows steps for a custom installation of new Agilent IO Libraries, when Agilent IO Libraries are **not** installed on your PC. You can use the custom installation option to select the components of the Agilent IO Libraries you want to install.

1. Turn the PC ON and, as required, install application software such as C/C++, VEE, etc. on your PC.

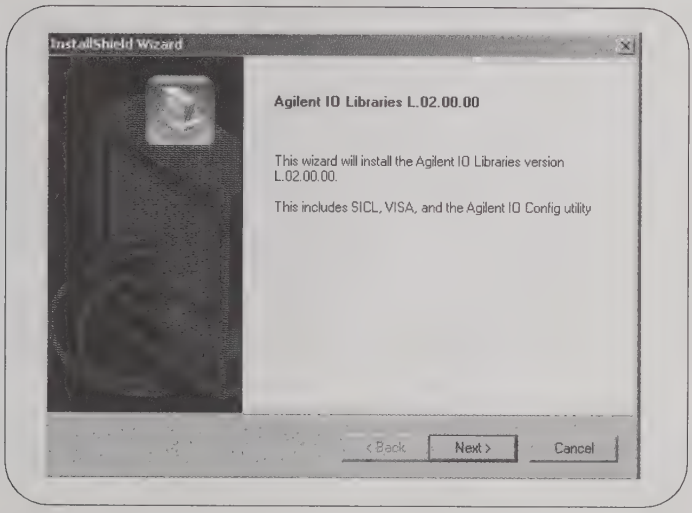
2. Insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

3. The installer should automatically start when the CD is inserted. If not, select **Start** | **Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

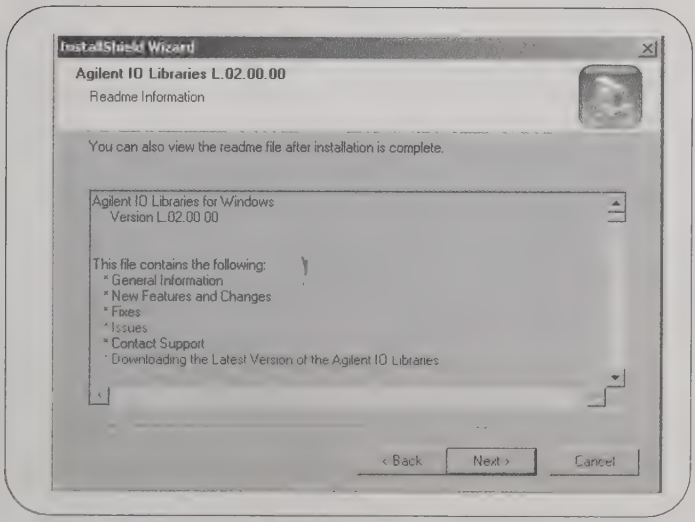
4. The InstallShield® Wizard appears to begin IO Libraries installation.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

5 After a few seconds, the **Title Screen** appears.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
This wizard will install the Agilent IO Libraries version L.02.00.00.
This includes SICL, VISA, and the Agilent IO Config utility
< Back
Next >
Cancel

6 From the **Title Screen**, click **Next>** to go to the **License Agreement** screen and then click **Yes** to accept the license terms and to display the **Readme Information** screen.

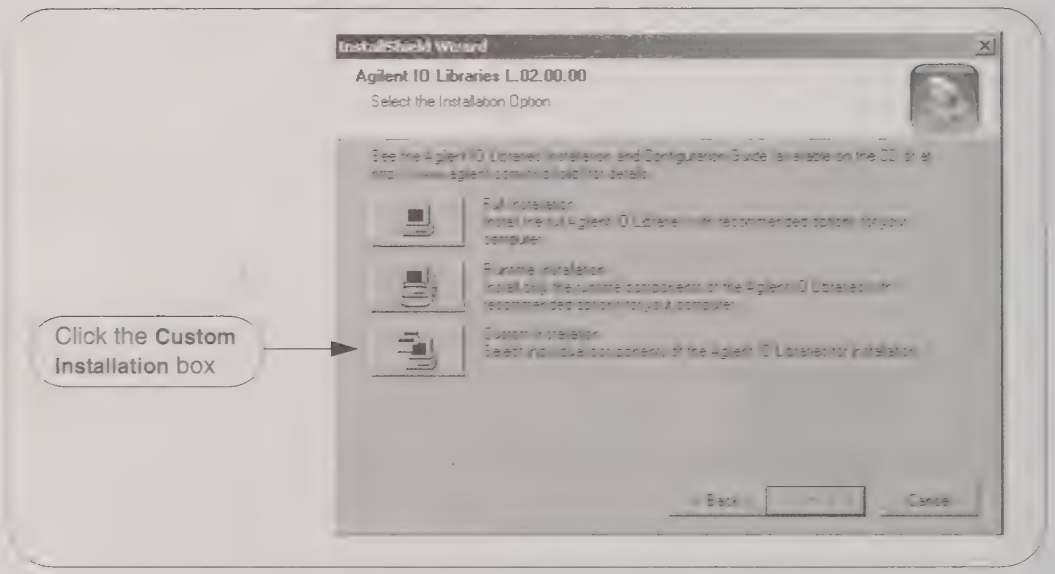

InstallShield Wizard
Agilent IO Libraries L.02.00.00
Readme Information
You can also view the readme file after installation is complete.
Agilent IO Libraries for Windows
Version L.02.00.00
This file contains the following:
* General Information
* New Features and Changes
* Fixes
* Issues
* Contact Support
* Downloading the Latest Version of the Agilent IO Libraries
< Back
Next >
Cancel

7 Scroll through the **Readme Information** screen to display the latest Agilent IO Libraries information.

- We highly recommend you read the **Readme Information** screen for the latest installation information before proceeding further with the installation.
- If you do not want to read the **Readme Information** screen at this time, after the Agilent IO Libraries are installed you can view the Readme information by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation | IO Libraries Readme**.

8 When finished with the **Readme Information** screen, click **Next>** to display the **Select the Installation Option** screen.

9 From the **Select the Installation Option** screen, click the **Custom Installation** box and then click **Next>** to display the **SICL Installation Directory** screen.

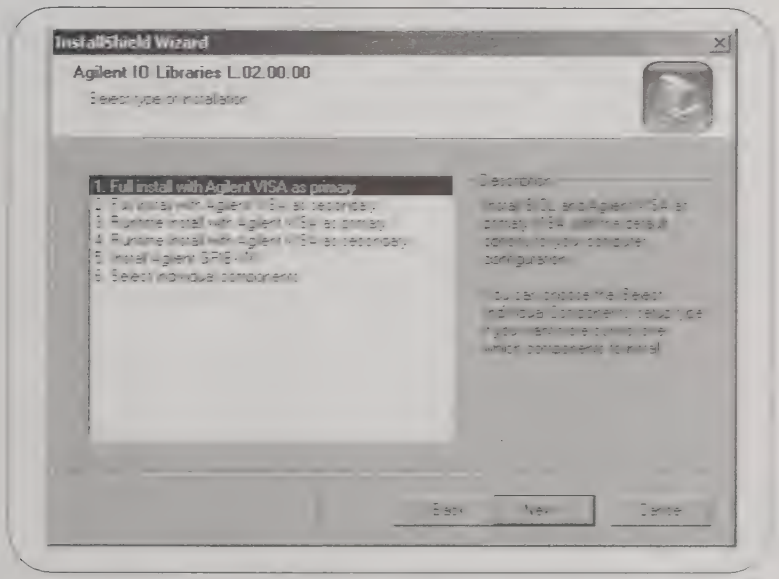


10 By default, SICL is installed in *C: Program Files Agilent IO Libraries*. Click **Next>** if you accept the default setting, or set the directory you want and then click **Next>** to display the **VISA installation directory** screen.

11 By default, VISA is installed in C:\Program Files\VISA. Click **Next>** to accept the default setting, or set the directory you want and then click **Next>** to display the **Select Type of Installation** screen.

NOTE

If another vendor's VISA is detected, you will not be prompted for the VISA directory. The existing VISA directory will be used.

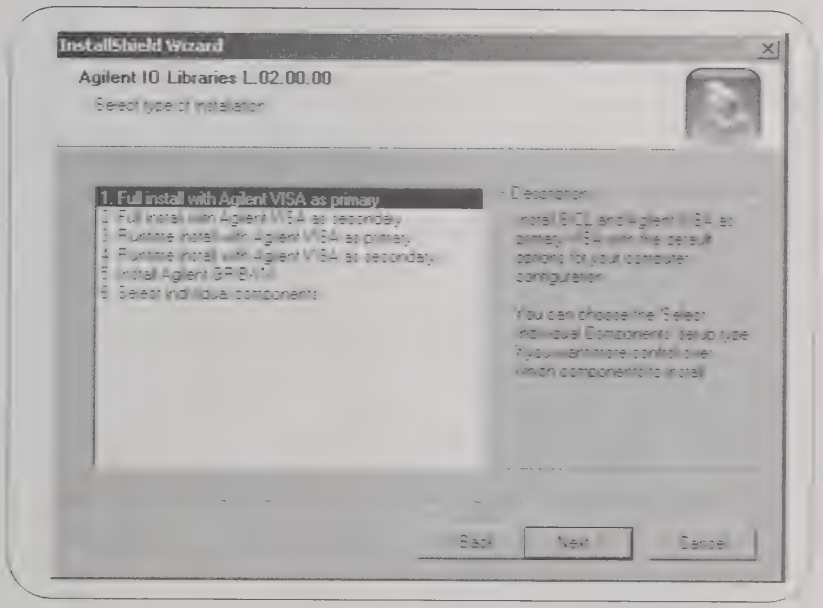


12 Use the following table for guidelines to select the type of installation for your application. Highlight your selection and then click **Next>** to install the option selected. Then, see the applicable step for the selection you made.

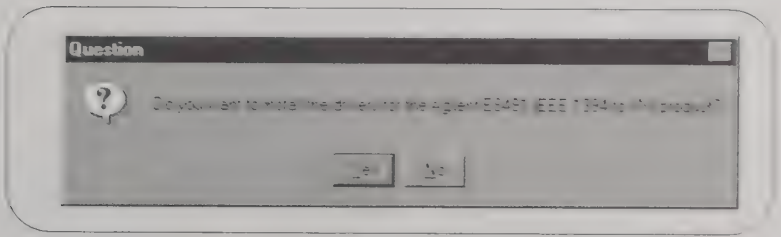
Option	See Step
1. Full install with Agilent VISA as primary	
Install SICL and Agilent VISA as primary VISA with the default options for your computer configuration. This is the default choice if another vendor's VISA is not detected. If another vendor's VISA is installed, installing this option **will overwrite** the other vendor's VISA. This option allows development and runtime capabilities using SICL and Agilent VISA for all supported interfaces.	12
2. Full install with Agilent VISA as secondary	
Install SICL and Agilent VISA as secondary VISA (side-by-side) with the default options for your computer configuration. This is the default choice if another vendor's VISA is detected. If another vendor's VISA is installed, installing this option **will not overwrite** another vendor's VISA. Normally, VISA programs use the primary VISA (either Agilent VISA or another vendor's VISA). VISA programs can be written to access Agilent VISA whether it is the primary or the secondary VISA. If you are using only SICL applications, you may want to install Agilent VISA as secondary VISA so that another vendor's VISA can be installed without conflict.	13
3. Runtime install with Agilent VISA as primary	
Install SICL and runtime Agilent VISA as primary VISA with the default options for your computer configuration. If another vendor's VISA is installed, installing this option **will overwrite** the other vendor's VISA. This option allows runtime only capabilities (not program development) using SICL and Agilent VISA for all supported interfaces.	14
4. Runtime install with Agilent VISA as secondary	
Install SICL and runtime Agilent VISA as secondary VISA with the default options for your computer configuration. If another vendor's VISA is installed, installing this option **will not overwrite** the other vendor's VISA. This option allows runtime only capabilities (not program development) using SICL and Agilent VISA for all supported interfaces.	15
5. Install Agilent GPIB-VXI	
Use this option if your system includes an Agilent VXI Command Module (such as an E1406, etc.) and another vendor's VISA. This option provides GPIB-VXI support for VXI Command Modules on another vendor's VISA. SICL and Agilent VISA are **not** installed.	16
6. Select Individual Components	
Allows you to install individually selected components of the IO Libraries, including SICL, VISA, E8491, and GPIB-VXI Support components.	17

13 **Option 1. Full install with Agilent VISA as primary**

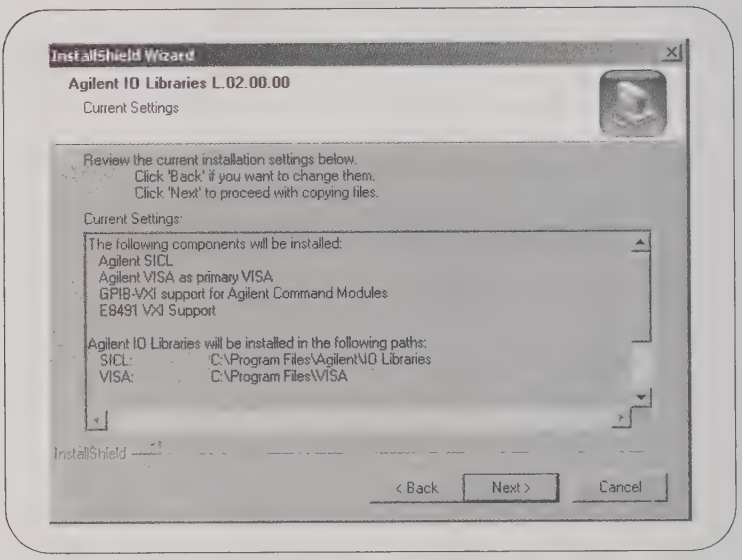
a From the **Select Type of Installation** screen. select **1. Full install with Agilent VISA as primary** and then click **Next>** to display the **Question** screen for E8491 support (for Windows NT 4.0 only).



- For Windows NT 4.0 ONLY. the **Question** dialog box appears. Click **Yes** to install the drivers, **No** to not install the drivers.
- For other operating systems, the E8491 drivers are automatically installed, so this this box does not appear.



b The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
The following components will be installed:
Agilent SICL
Agilent VISA as primary VISA
GPIB-VXI support for Agilent Command Modules
E8491 VXI Support
Agilent IO Libraries will be installed in the following paths:
SICL: C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
InstallShield
< Back
Next >
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

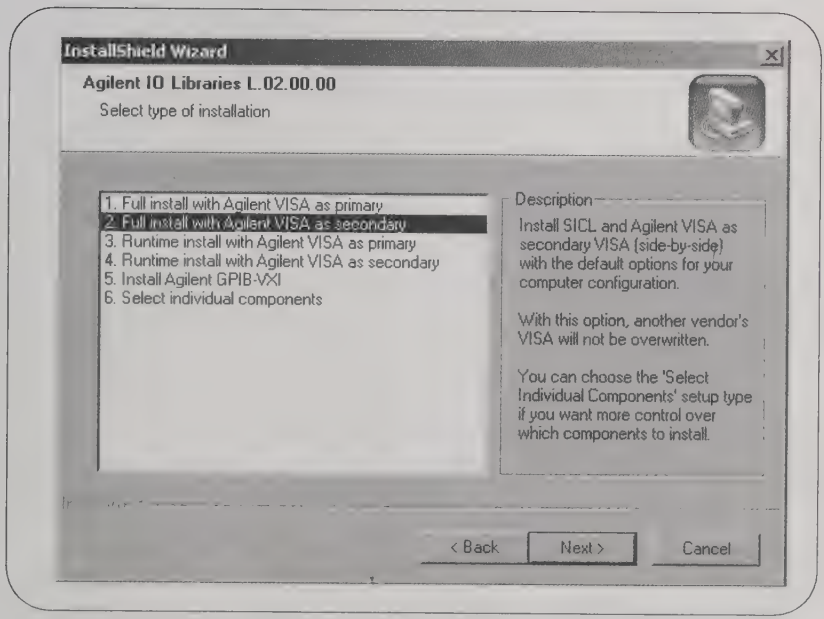
- **To Change the VISA Installation Path.** To change the VISA installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Type of Installation** screen. From this screen, select the **6. Choose Individual Components** box and then click **Next>** to proceed with a custom installation. See Step 17 for installation guidelines.

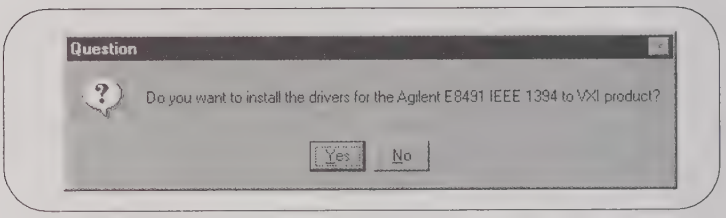
14 Option 2. Full install with Agilent VISA as secondary

a From the **Select Type of Installation** screen, select **2. Full install with Agilent VISA as secondary** and then click **Next>** to display the **Question** screen for E8491 support (for Windows NT 4.0 only).

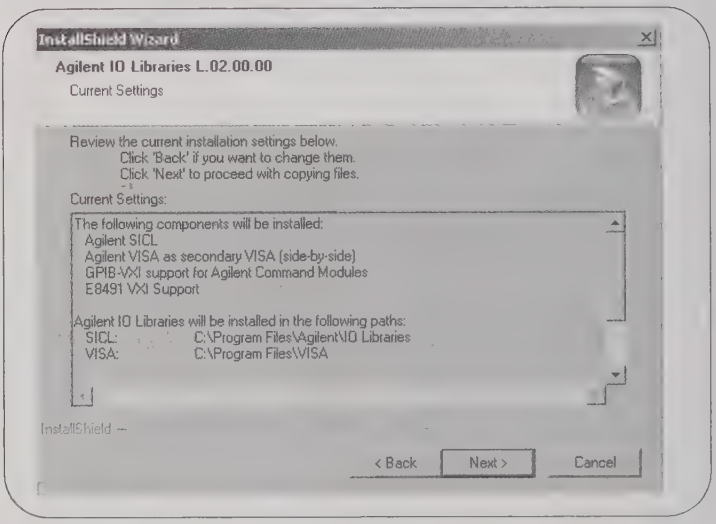

InstallShield Wizard
Agilent IO Libraries L.02.00.00
Select type of installation
1. Full install with Agilent VISA as primary
2. Full install with Agilent VISA as secondary
3. Runtime install with Agilent VISA as primary
4. Runtime install with Agilent VISA as secondary
5. Install Agilent GPIB-VXI
6. Select individual components
Description
Install SICL and Agilent VISA as secondary VISA (side-by-side) with the default options for your computer configuration.
With this option, another vendor's VISA will not be overwritten.
You can choose the 'Select Individual Components' setup type if you want more control over which components to install.
< Back
Next >
Cancel

- For Windows NT 4.0 ONLY, the **Question** dialog box appears. Click **Yes** to install the drivers, **No** to not install the drivers.

- For other operating systems, the E8491 drivers are automatically installed, so this this box does not appear.



b The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
The following components will be installed:
Agilent SICL
Agilent VISA as secondary VISA (side-by-side)
GPIB-VXI support for Agilent Command Modules
E8491 VXI Support
Agilent IO Libraries will be installed in the following paths:
SICL: C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
InstallShield
< Back
Next >
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

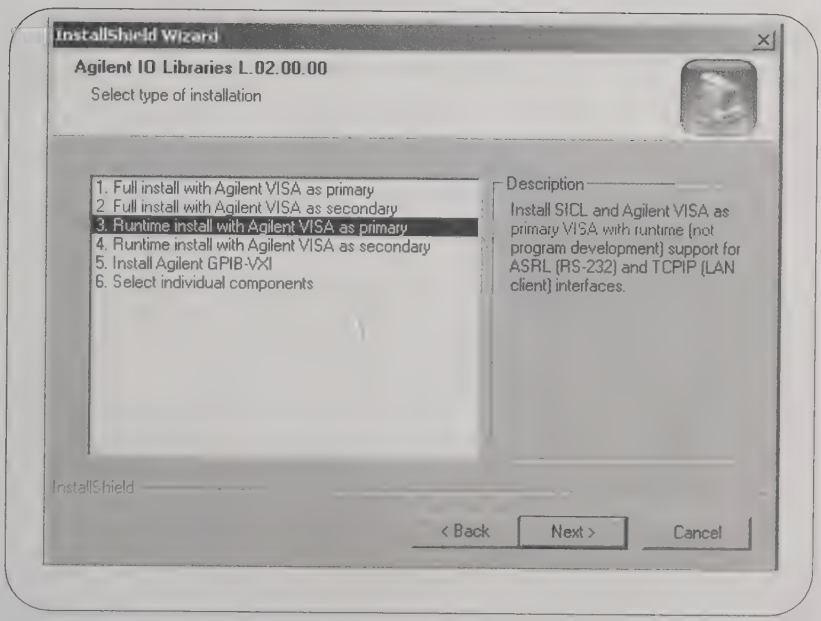
- **To Change the VISA Installation Path.** To change the VISA installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>**.

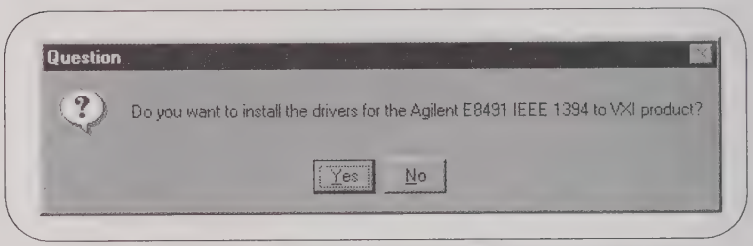
- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Type of Installation** screen. From this screen, select the **6. Choose Individual Components** box and then click **Next>** to proceed with a custom installation. See Step 17 for installation guidelines.

15 Option 3. Runtime install with Agilent VISA as primary

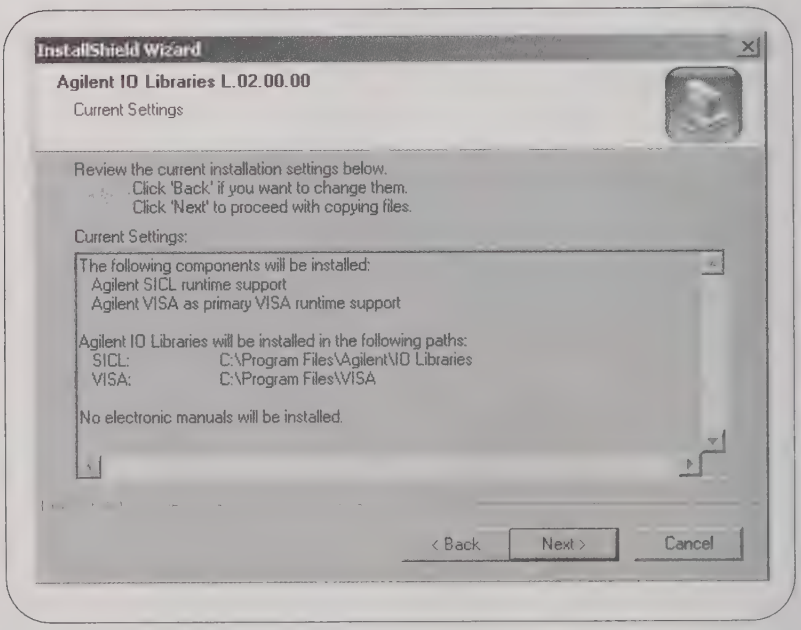
a From the **Select Type of Installation** screen, select **3. Runtime install with Agilent VISA as primary** and then click **Next>** to display the **Question** screen for E8491 support (for Windows NT 4.0 only).


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Select type of installation
1. Full install with Agilent VISA as primary
2. Full install with Agilent VISA as secondary
3. Runtime install with Agilent VISA as primary
4. Runtime install with Agilent VISA as secondary
5. Install Agilent GPIB-VXI
6. Select individual components
Description
Install SICL and Agilent VISA as primary VISA with runtime (not program development) support for ASRL (RS-232) and TCPIP (LAN client) interfaces.
InstallShield
< Back
Next >
Cancel

- For Windows NT 4.0 ONLY, the **Question** dialog box appears. Click **Yes** to install the drivers, **No** to not install the drivers.
- For other operating systems, the E8491 drivers are automatically installed, so this this box does not appear.



b The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
The following components will be installed:
Agilent SICL runtime support
Agilent VISA as primary VISA runtime support
Agilent IO Libraries will be installed in the following paths:
SICL: C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
No electronic manuals will be installed.
< Back
Next >
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

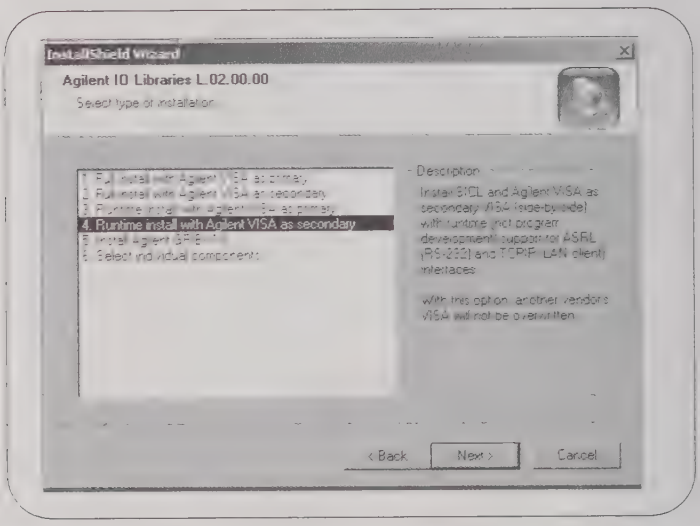
- **To Change the VISA Installation Path.** To change the VISA installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>**.

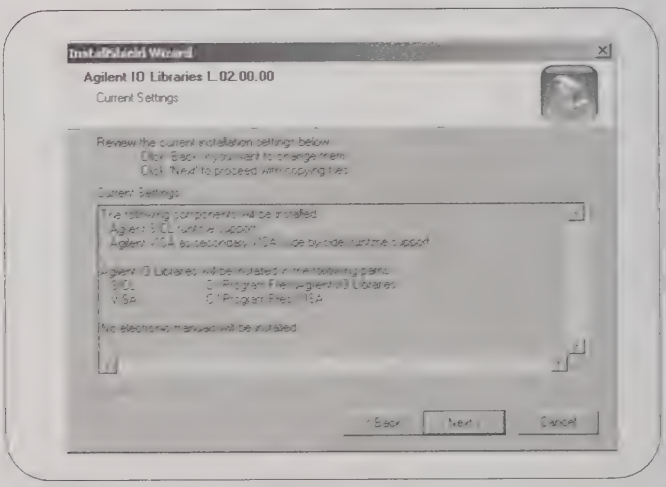
- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Type of Installation** screen. From this screen, select the **6. Choose Individual Components** box and then click **Next>** to proceed with a custom installation. See Step 17 for installation guidelines.

16 **Option 4. Runtime install with Agilent VISA as secondary**

a From the **Select Type of Installation** screen, select **4. Runtime install with Agilent VISA as secondary**.



b Then, click **Next** to display the **Current Settings** dialog box. This box shows the (default) paths in which SICL will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

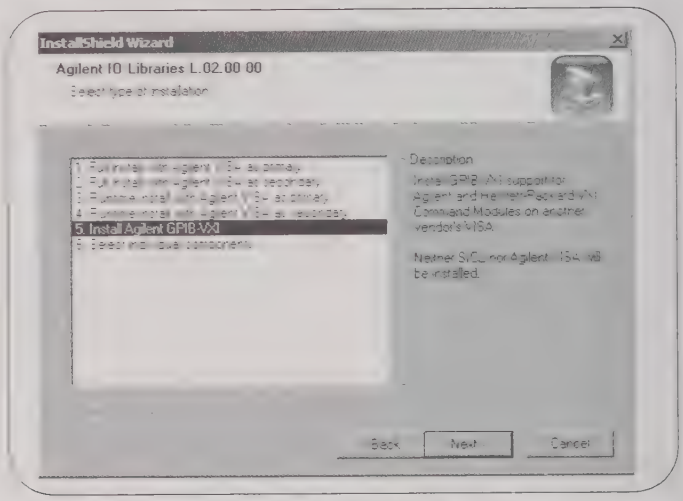
- **To Change the VISA Installation Path.** To change the VISA installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>**.

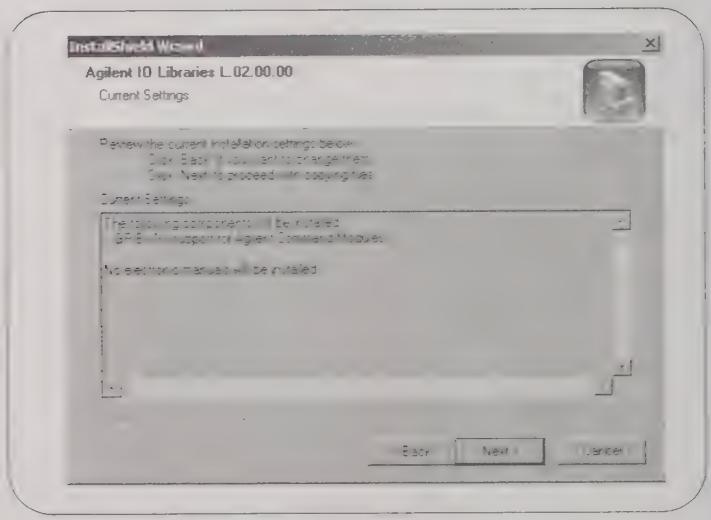
- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Type of Installation** screen. From this screen, select the **6. Choose Individual Components** box and then click **Next>** to proceed with a custom installation. See Step 17 for installation guidelines.

17 Option 5. Install Agilent GPIB-VXI

a From the **Select Type of Installation** screen, select **5. Install Agilent GPIB-VXI.**



b Then, click **Next>** to display the **Current Settings** dialog box. This box shows the (default) paths in which VISA and SICL will be installed and the components that will be installed.



- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>.**

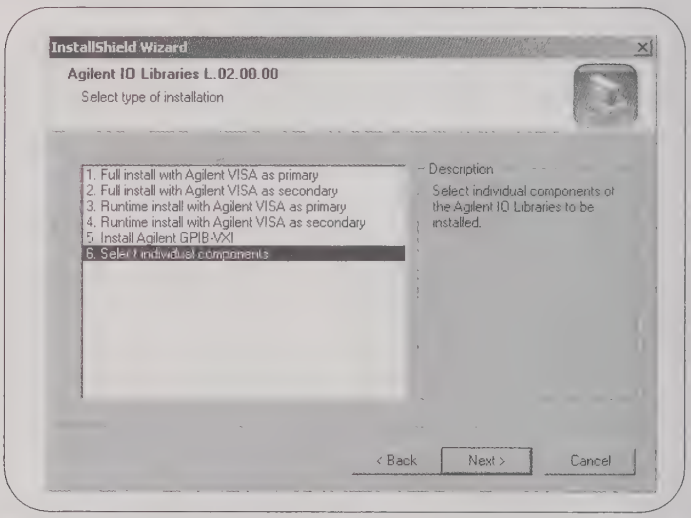
NOTE

GPIB-VXI can only be installed if another vendor's VISA is already installed. Thus, you will not be prompted for the VISA installation path.

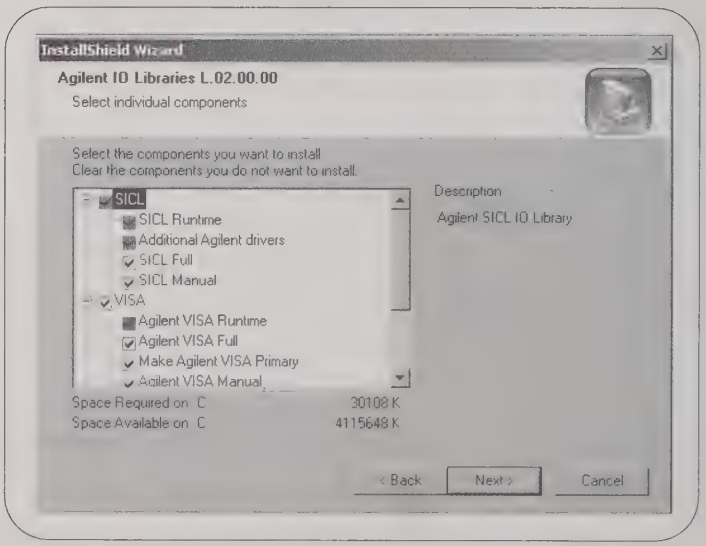
- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Type of Installation** screen. From this screen, select the **6. Choose Individual Components** box and then click **Next>** to proceed with a custom installation. See Step 17 for installation guidelines.

18 Option 6. Select individual components

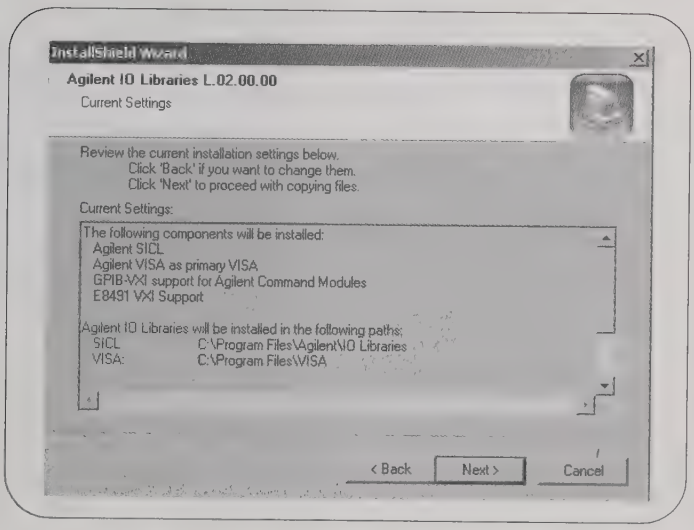
a From the **Select Type of Installation** screen, select **6. Select individual components.**


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Select type of installation
1. Full install with Agilent VISA as primary
2. Full install with Agilent VISA as secondary
3. Runtime install with Agilent VISA as primary
4. Runtime install with Agilent VISA as secondary
5. Install Agilent GPIB-VXI
6. Select individual components
Description
Select individual components of the Agilent IO Libraries to be installed.
< Back
Next >
Cancel

b Then, click **Next>** to display the **Select Individual Components** dialog box.



c Select the components you want to install and clear the components you do not want to install. Then, click **Next>** to display the **Current Settings** dialog box. This box shows the (default) paths in which VISA and SICL will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Review the current installation settings below.
Click 'Back' if you want to change them.
Click 'Next' to proceed with copying files.
Current Settings:
The following components will be installed:
Agilent SICL
Agilent VISA as primary VISA
GPIB-VXI support for Agilent Command Modules
E8491 VXI Support
Agilent IO Libraries will be installed in the following paths:
SICL C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
< Back
Next >
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 18).

- **To Change the VISA Installation Path.** To change the VISA installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Change the path as desired and then click **Next>**.

- **To Change the SICL Installation Path.** To change the SICL installation path, click **<Back** on the **Current Settings** screen and **<Back** on the **Select Type of Installation** screen to display the **VISA Installation Directory** screen. Then, click **<Back** on the **VISA Installation Directory** screen to display the **SICL Installation Directory** screen. Change the path as desired and then click **Next>**.

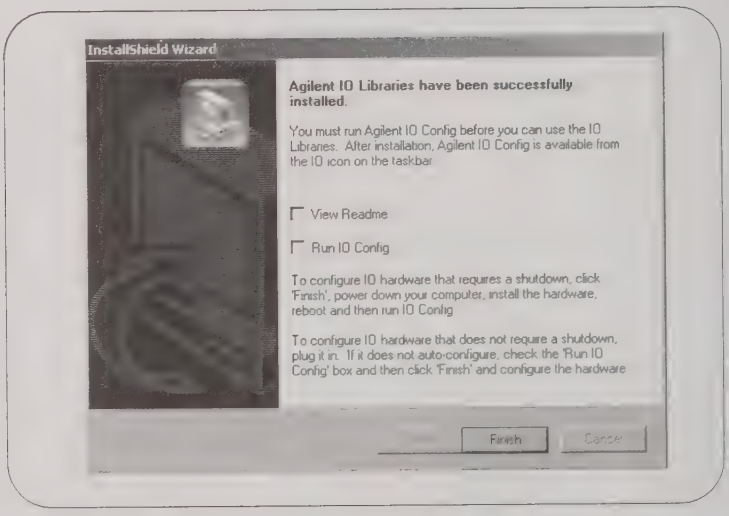
- **To Change the IO Libraries Components to be installed.** To change the components to be installed, click **<Back** to re-display the **Select Individual Components** screen. Change the components to be installed and then click **Next>**.

Installing I/O Interfaces

19 As the last step in the Agilent IO Libraries installation, the **Agilent IO Libraries have been successfully installed** screen appears. Use the guidelines in the following table for the steps to install I/O interfaces.

NOTE

Before you click Finish to install the Agilent IO Libraries, complete Step 19, 20, 21, or 22 (as applicable) and Step 23 to install I/O interfaces.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar.
View Readme
Run IO Config
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware, reboot and then run IO Config.
To configure IO hardware that does not require a shutdown, plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware.
Finish
Cancel

Windows	Hardware	Use Step
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 21 and 22) that requires a shutdown for installation	19
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 21 and 22) that does not require a shutdown for installation	20

Windows	Hardware	Use Step
98/Me/2000/XP Pro	Agilent 1394 FireWire and E8491B VXI Interface cards	21*
98/Me/2000/XP Pro	Agilent 82350 PCI GPIB card	22*

* Do NOT use Steps 21 or 22 for Windows NT.

20 **If an I/O Interface Installation Requires Shutdown.** To install and configure I/O interfaces that require a power shutdown:

- **a** As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.
- **c** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **d** Power down your PC, install the I/O hardware, and reboot your PC.
- **e** Go to Step 23.

21 **If an I/O Interface Installation Does Not Require Shutdown.** To install and configure I/O interfaces that do not require a power shutdown:

- **a** Check the **View Readme** box (as desired) and check the **Run IO Config** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Connect the hardware to your PC and wait for an auto-configure action.
- **c** If the hardware does not auto-configure, click **Finish** to display the IO Config main screen. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is also displayed.
- **d** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **e** Go to Step 23.

22 **For E8491B VXI Hardware Only.** To install and configure an Agilent 1394 FireWire Card connected to an E8491B VXI Interface card in a Windows 98/Me/2000/XP Professional operating system:

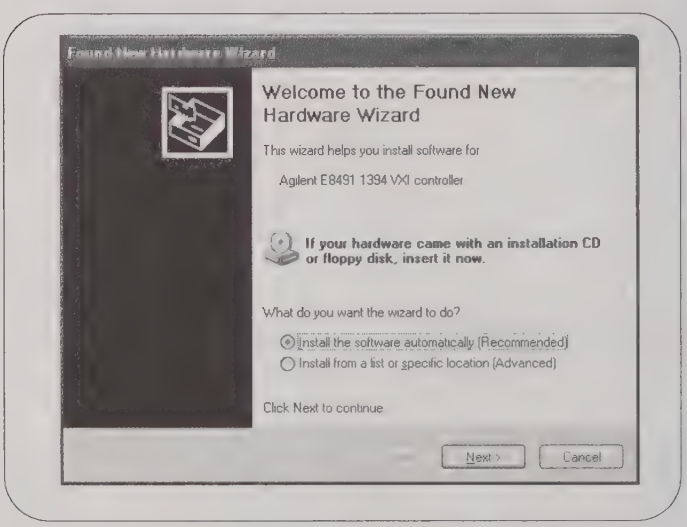
a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down your PC and turn VXI mainframe power OFF.

d Install an IEEE-1394 FireWire card. Use a FireWire cable to connect the IEEE-1394 card to an E8491B VXI interface card in a VXI mainframe. Then, power up the mainframe and turn your PC ON.

e As Windows 98, Me, 2000, or XP Professional restarts, a **Found New Hardware Wizard** starts. Use the following table for the actions to take for each operating system. Then, go to Step 23.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for
Agilent E8491 1394 VXI controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
Next >
Cancel

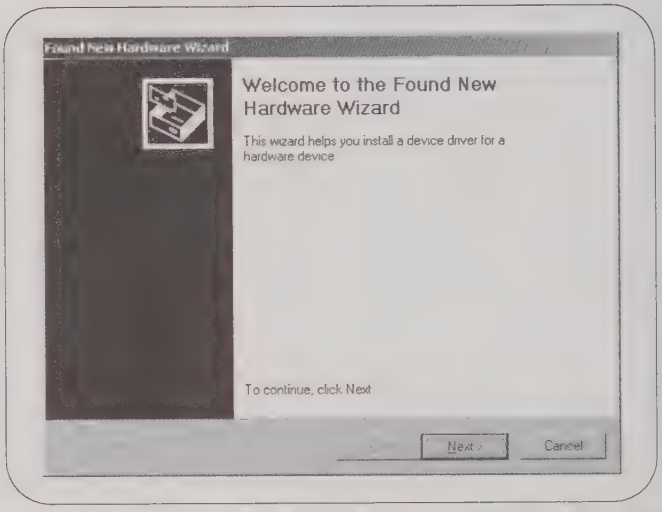
OS	Action
98	■ If the Wizard asks for the *1394bus.sys* file, provide the CD for the Windows 98 operating system and let the Wizard search for and install the file. ■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
Me	■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

23 **For 82350 PCI GPIB Hardware Only.** To configure a Windows 98/Me/2000/XP Professional operating system that has an Agilent 82350 PCI GPIB Card installed in the PC:

a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down the PC and install the 82350 in a PCI slot. Then, power up the mainframe and turn the PC ON. As Windows 98/Me/2000/ XP Professional restarts, a **Found New Hardware Wizard** will start.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device
To continue, click Next
Next >
Cancel

d Use the following table for the actions to take for each operating system. Then, go to Step 23.

OS	Action
98/Me	■ When the Wizard asks for the HPIOLibraries CD, click **OK**. ■ When the Wizard asks for the *hpioclas.dll* file, browse to C:\windows\system\ and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

Configuring I/O Interfaces

24 To configure the I/O interfaces, run IO Config by clicking the blue IO icon and clicking **Run IO Config**. Follow the on-screen instructions to configure the interface. See *Chapter 4 - Using IO Configuration Utilities* for information on using IO Config.

Programming via I/O Interfaces

25 You can use VISA Assistant to communicate between your PC and instruments. See *Chapter 4 - Using IO Configuration Utilities* for information on VISA Assistant.

a To begin programming via the interface using Agilent VISA or SICL, see *Chapter 5 - Configuring I/O Interfaces*.

b For information on using Agilent VISA, see the *Agilent VISA User's Guide*. For information on SICL, see the *Agilent SICL User's Guide for Windows*. Both documents are available in electronic form by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation**.

Upgrading Existing Libraries

This section shows suggested steps to upgrade a current version of the Agilent IO Libraries to a newer version of the Agilent IO Libraries, including:

- Installing the IO Libraries
- Installing I/O Interfaces
- Configuring I/O Interfaces
- Programming via I/O Interfaces

Installing the IO Libraries

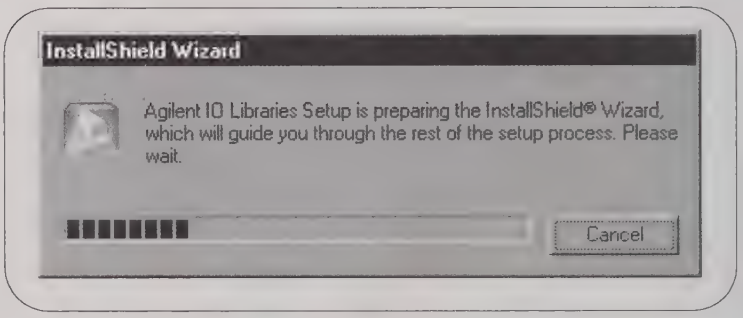
Use these steps to **upgrade** existing Agilent IO Libraries to a new version of the libraries. The steps in this section assume version L.01.01 or earlier of the Agilent IO Libraries is already installed on your PC and you are installing version L.02.00 or later of the Agilent IO Libraries.

1. Turn the PC ON and, as required, install application software such as C/C++, VEE, etc. on your PC.

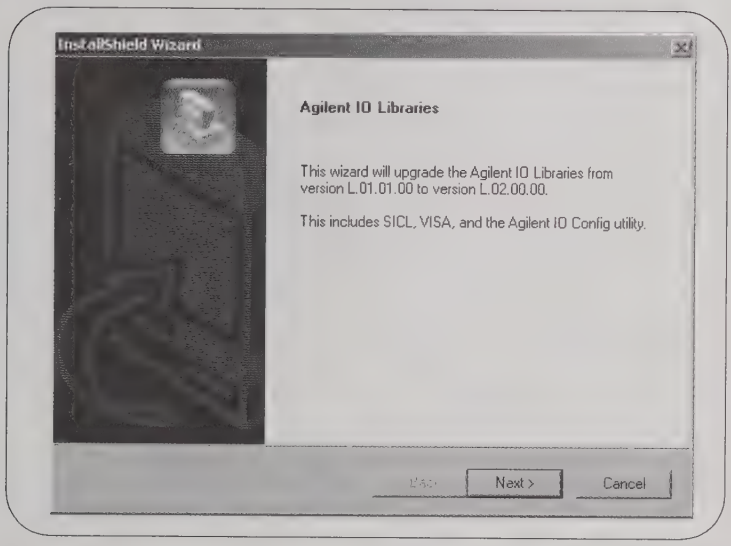
2. Insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

3. The installer should automatically start when the CD is inserted. If not, select **Start** | **Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

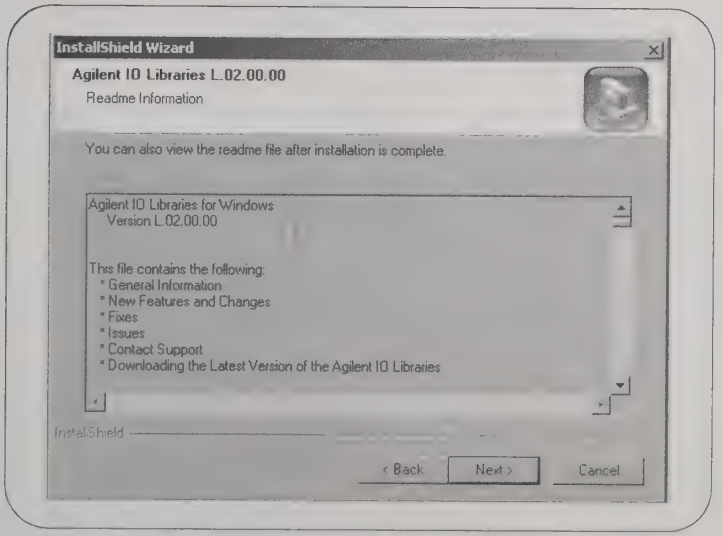
4. The InstallShield® Wizard appears to begin the Agilent IO Libraries installation.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

5 After a few seconds, the **Title Screen** appears.


InstallShield Wizard
Agilent IO Libraries
This wizard will upgrade the Agilent IO Libraries from version L.01.01.00 to version L.02.00.00.
This includes SICL, VISA, and the Agilent IO Config utility.
Next >
Cancel

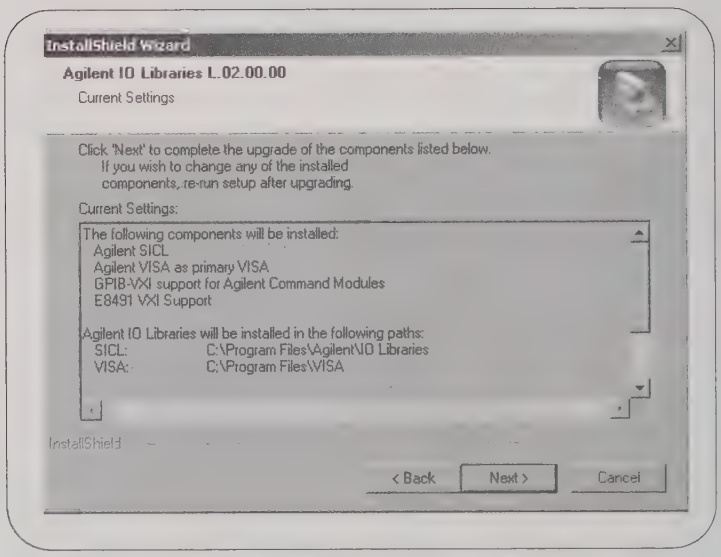
6 From the **Title Screen**, click **Next>** to go to the **License Agreement** screen and then click **Yes** to accept the license terms and to display the **Readme Information** screen.



7 Scroll through the **Readme Information** screen to display the latest Agilent IO Libraries information. Then, click **Next>** to display the **Current Settings** dialog box.

- We highly recommend you read the **Readme Information** screen for the latest installation information before proceeding further with the installation.
- If you do not want to read the **Readme Information** screen at this time, after the Agilent IO Libraries are installed you can view the Readme information by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation | IO Libraries Readme.**

8 The **Current Settings** dialog box appears. This box shows the (default) paths in which SICL and VISA will be installed and the components that will be installed.


InstallShield Wizard
Agilent IO Libraries L.02.00.00
Current Settings
Click 'Next' to complete the upgrade of the components listed below.
If you wish to change any of the installed components, re-run setup after upgrading.
Current Settings:
The following components will be installed:
Agilent SICL
Agilent VISA as primary VISA
GPIB-VXI support for Agilent Command Modules
E8491 VXI Support
Agilent IO Libraries will be installed in the following paths:
SICL: C:\Program Files\Agilent\IO Libraries
VISA: C:\Program Files\VISA
InstallShield
< Back
Next >
Cancel

- **To Accept the Settings.** To accept the settings shown, click **Next>**. Setup will then install the files and display the **Agilent IO Libraries have been successfully installed** screen (see Step 9).

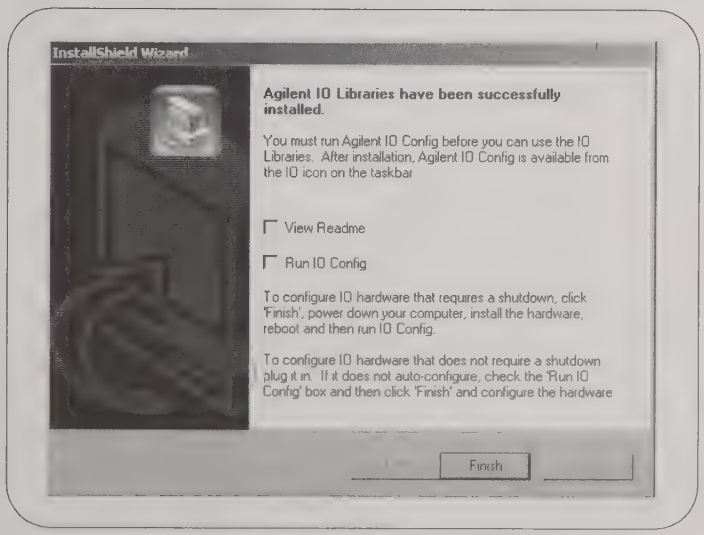
- **To Change the Settings.** To change the settings shown, you will first need to complete the upgrade installation and then re-run the Agilent IO Libraries installation. For a full installation, see "Installing a Full Version of New Libraries". For a custom installation, see "Installing a Custom Version of New Libraries".

Installing I/O Interfaces

9 As the last step in the Agilent IO Libraries installation, the **Agilent IO Libraries have been successfully installed** screen appears. Use the guidelines in the following table for the steps to install any new I/O interfaces.

NOTE

Before you click Finish to install the Agilent IO Libraries, complete Step 10, 11, 12, or 13 (as applicable) and Step 14 to install I/O interfaces.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar
View Readme
Run IO Config
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware, reboot and then run IO Config.
To configure IO hardware that does not require a shutdown plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware
Finish

Windows	Hardware	Use Step
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 12 and 13) that requires a shutdown for installation	10
98/Me/2000/NT/XP Pro	Any I/O hardware (except that listed in Steps 12 and 13) that does not require a shutdown for installation	11
98/Me/2000/XP Pro	Agilent 1394 FireWire and E8491B VXI Interface cards	12*
98/Me/2000/XP Pro	Agilent 82350 PCI GPIB card	13*

* Do NOT use Steps 12 or 13 for Windows NT.

10 **If an I/O Interface Installation Requires Shutdown.** To install and configure I/O interfaces that require a power shutdown:

- **a** As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.
- **c** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **d** Power down your PC, install the I/O hardware, and reboot your PC.
- **e** Go to Step 14.

11 **If an I/O Interface Installation Does Not Require Shutdown.** To install and configure I/O interfaces that do not require a power shutdown:

- **a** Check the **View Readme** box (as desired) and check the **Run IO Config** box on the **Agilent IO Libraries have been successfully installed** screen.
- **b** Connect the hardware to your PC and wait for an auto-configure action.
- **c** If the hardware does not auto-configure, click **Finish** to display the IO Config main screen. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is also displayed.
- **d** Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.
- **e** Go to Step 14.

12 **For E8491B VXI Hardware Only.** To install and configure an Agilent 1394 FireWire Card connected to an E8491B VXI Interface card in a Windows 98/Me/2000/XP Professional operating system:

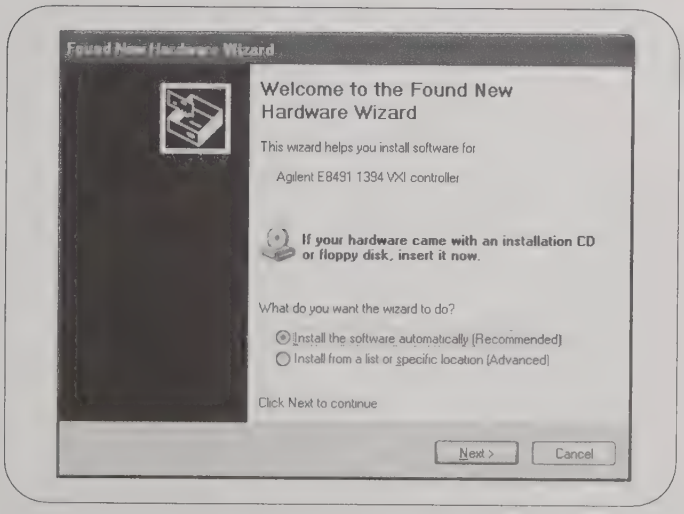
a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down your PC and turn VXI mainframe power OFF.

d Install an IEEE-1394 FireWire card. Use a FireWire cable to connect the IEEE-1394 card to an E8491B VXI interface card in a VXI mainframe. Then, power up the mainframe and turn your PC ON.

e As Windows 98, Me, 2000, or XP Professional restarts, a **Found New Hardware Wizard** starts. Use the following table for the actions to take for each operating system. Then, go to Step 14.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for
Agilent E8491 1394 VXI controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue
Next >
Cancel

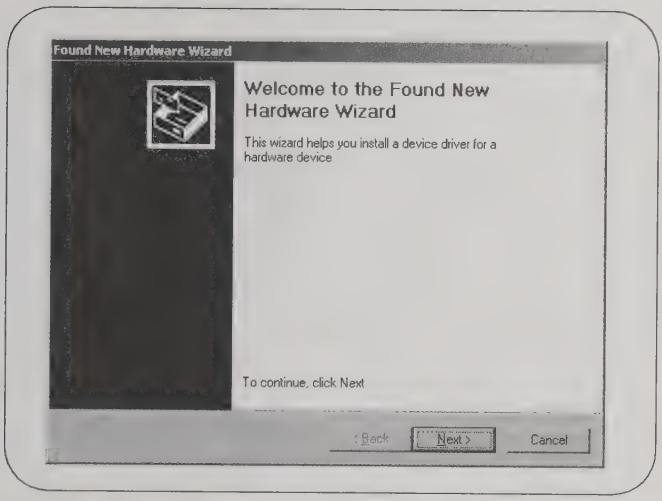
OS	Action
98	■ If the Wizard asks for the *1394bus.sys* file, provide the CD for the Windows 98 operating system and let the Wizard search for and install the file. ■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
Me	■ When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. ■ Browse to C:\Winnt\system32\drivers\ and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

13 **For 82350 PCI GPIB Hardware Only.** To configure a Windows 98/Me/2000/XP Professional operating system that has an Agilent 82350 PCI GPIB Card installed in the PC:

a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

b Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

c Shut down the PC and install the 82350 in a PCI slot. Then, power up the mainframe and turn the PC ON. As Windows 98/Me/2000/ XP Professonal restarts, a **Found New Hardware Wizard** will start.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device
To continue, click Next
< Back
Next >
Cancel

d Use the following table for the actions to take for each operating system. Then, go to Step 14.

OS	Action
98/Me	■ When the Wizard asks for the HPIOLibraries CD, click **OK**. ■ When the Wizard asks for the *hpioclas.dll* file, browse to *C:\windows\system* and click **OK**.
2000/ XP Pro	■ Click **Next>** to accept the default suggestions. ■ Click **Finish** to complete the installation.

Configuring I/O Interfaces

14 To configure the I/O interfaces, run IO Config by clicking the blue IO icon and clicking **Run IO Config**. Follow the on-screen instructions to configure the interface. See *Chapter 4 - Using IO Configuration Utilities* for information on using IO Config.

Programming via I/O Interfaces

15 You can use VISA Assistant to communicate between your PC and instruments. See *Chapter 4 - Using IO Configuration Utilities* for information on VISA Assistant.

a To begin programming via the interface using Agilent VISA or SICL, see *Chapter 5 - Configuring I/O Interfaces*.

b For information on using Agilent VISA, see the *Agilent VISA User's Guide*. For information on SICL, see the *Agilent SICL User's Guide for Windows*. Both documents are available in electronic form by clicking the blue IO icon on the Windows taskbar and clicking **View Documentation.**

Maintaining Existing Libraries

This section gives suggested steps to modify, repair or remove existing Agilent IO Libraries, including:

- Modifying Existing Libraries
- Repairing Existing Libraries
- Removing Existing Libraries

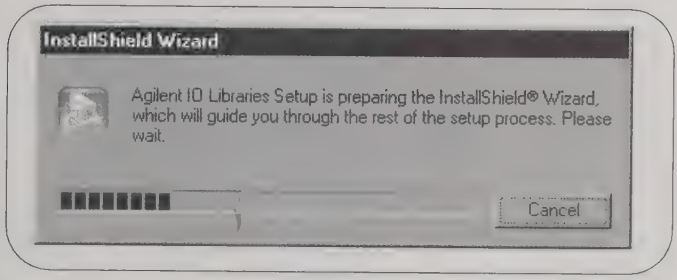
Modifying Existing Libraries

This section gives suggested steps to modify existing Agilent IO Libraries.

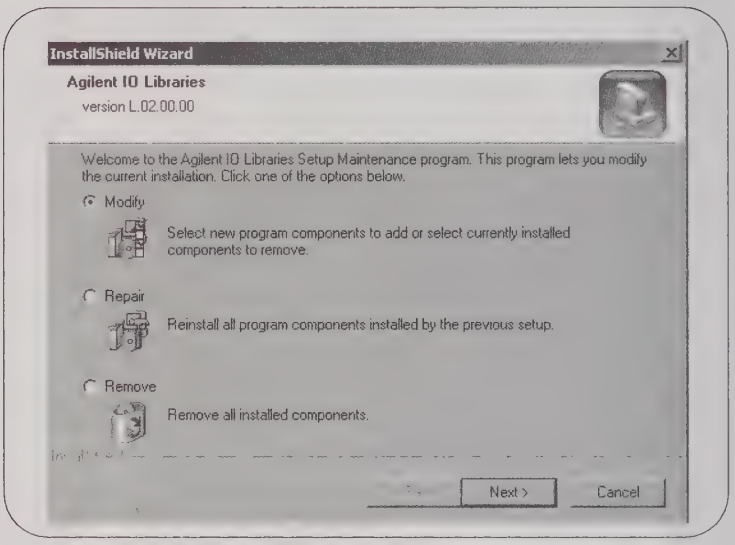
1. Turn your PC ON, insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

2. The installer should automatically start when the CD is inserted. If not, select **Start | Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

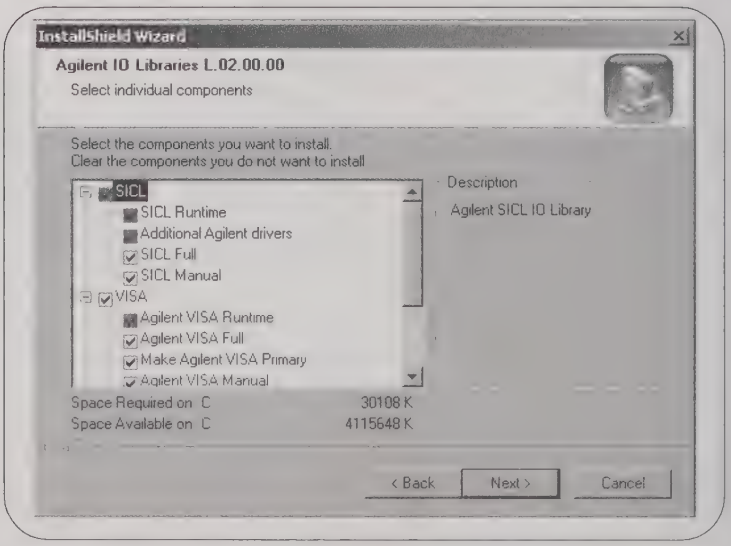
3. The InstallShield® Wizard appears to begin the Agilent IO Libraries modification process.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

4. After a few seconds, the **Setup Maintenance** screen appears. From this screen, select **Modify** and then click **Next>** to display the **Tree View** screen.


InstallShield Wizard
Agilent IO Libraries
version L.02.00.00
Welcome to the Agilent IO Libraries Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.
Modify
Select new program components to add or select currently installed components to remove.
Repair
Reinstall all program components installed by the previous setup.
Remove
Remove all installed components.
Next >
Cancel

5 When the **Tree View** screen appears, select the components you want to install and clear the components you do not want to install. Then, click **Next>** to begin the (modified) installation.

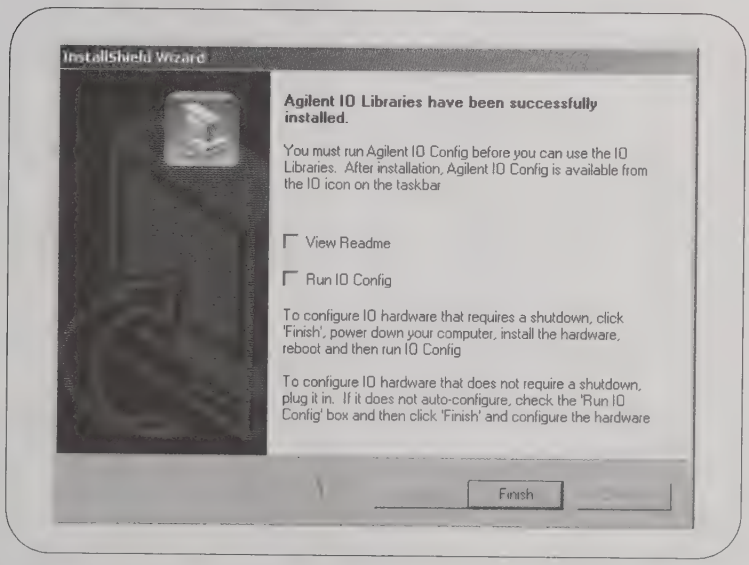


6 Setup then installs/clears items you selected. When the **Agilent IO Libraries have been successfully installed** screen appears, you can click **Finish** to complete the process.

   a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

   b If you want to configure interfaces, click **Run IO Config** and then click **Finish**. See *Chapter 4 - Using IO Configuration Utilities* for information on the IO Config utility.

7 Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar
View Readme
Run IO Config
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware, reboot and then run IO Config
To configure IO hardware that does not require a shutdown, plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware
Finish

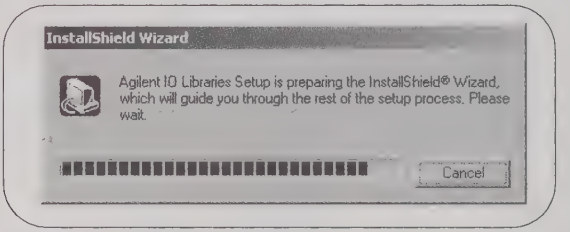
Repairing Existing Libraries

This section gives suggested steps to repair existing Agilent IO Libraries.

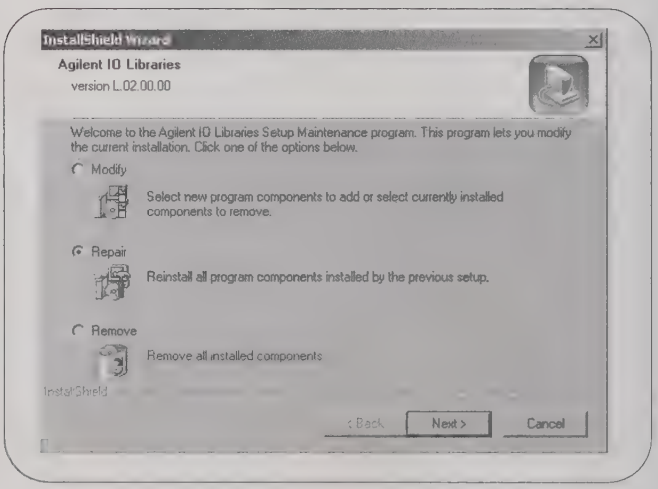
1. Turn the PC ON, insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

2. The installer should automatically start when the CD is inserted. If not, select **Start | Run** and type ***<drive>*:setup.exe**, where ***drive*** is your CD-ROM drive.

3. The InstallShield® Wizard appears to begin the Agilent IO Libraries repair process.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

4. After a few seconds, the **IO Libraries Setup Maintenance** screen appears. From this screen, select **Repair** and then click **Next>** to re-install all IO Libraries components installed by the previous setup.

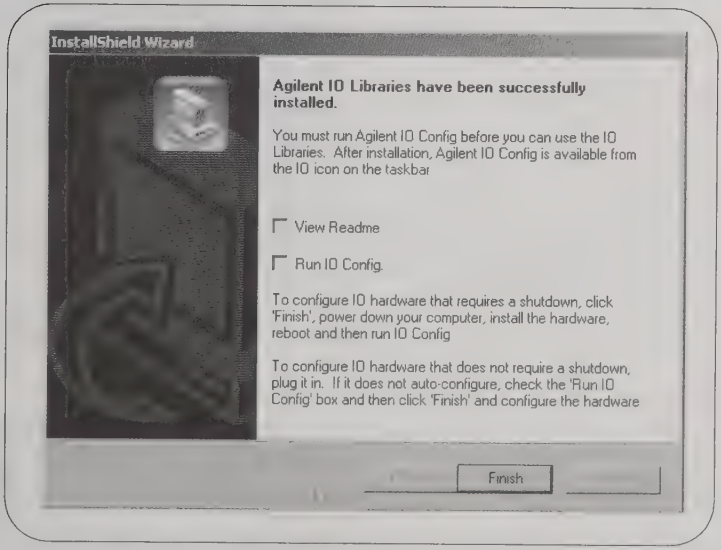

InstallShield Wizard
Agilent IO Libraries
version L.02.00.00
Welcome to the Agilent IO Libraries Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.
Modify
Select new program components to add or select currently installed components to remove.
Repair
Reinstall all program components installed by the previous setup.
Remove
Remove all installed components
InstallShield
< Back
Next >
Cancel

5 Setup then replaces any missing Agilent IO Libraries files. When the **Agilent IO Libraries have been successfully installed** screen appears, you can click **Finish** to complete the process.

   a As desired, check the **View Readme** box on the **Agilent IO Libraries have been successfully installed** screen. Then, click **Finish** to complete the Agilent IO Libraries installation. If you checked the **View Readme** box, the Agilent IO Libraries Readme file is displayed.

   b If you want to configure interfaces, click **Run IO Config** and then click **Finish**. See *Chapter 4 - Using IO Configuration Utilities* for information on the IO Config utility.

6 Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.


InstallShield Wizard
Agilent IO Libraries have been successfully installed.
You must run Agilent IO Config before you can use the IO Libraries. After installation, Agilent IO Config is available from the IO icon on the taskbar
View Readme
Run IO Config.
To configure IO hardware that requires a shutdown, click 'Finish', power down your computer, install the hardware, reboot and then run IO Config
To configure IO hardware that does not require a shutdown, plug it in. If it does not auto-configure, check the 'Run IO Config' box and then click 'Finish' and configure the hardware
Finish

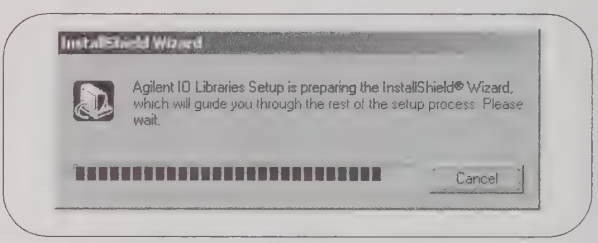
Removing Existing Libraries

This section gives suggested steps to remove existing Agilent IO Libraries.

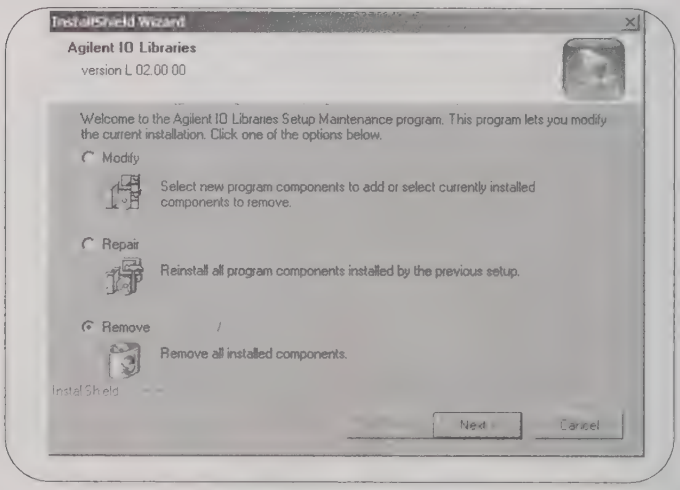
1. Turn the PC ON, insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive and wait a few seconds for the application to run.

2. The installer should automatically start when the CD is inserted. If not, select **Start** | **Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

3. The InstallShield® Wizard appears to begin the Agilent IO Libraries removal process.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

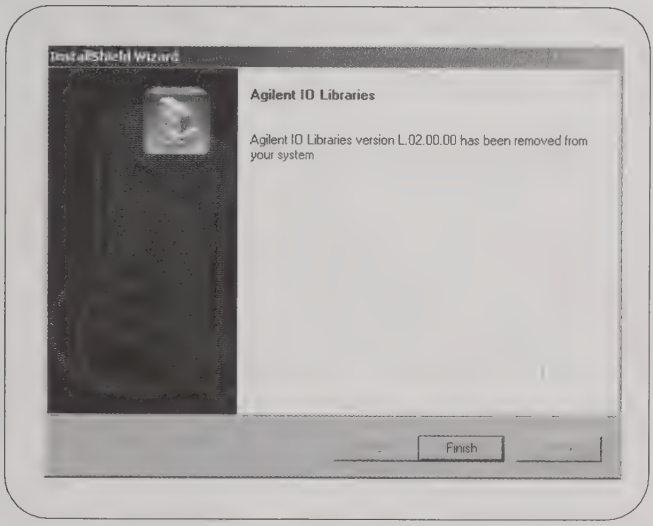
4. After a few seconds, the **IO Libraries Setup Maintenance** screen appears. From this screen, select **Remove** and then click **Next** to remove the current IO Libraries installation.


InstallShield Wizard
Agilent IO Libraries
version L.02.00.00
Welcome to the Agilent IO Libraries Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.
Modify
Select new program components to add or select currently installed components to remove.
Repair
Reinstall all program components installed by the previous setup.
Remove
Remove all installed components.
InstallShield
Next >
Cancel

5 The **Confirm Delete** screen appears. Click **Yes** to delete all currently installed Agilent IO Libraries components.

6 When component removal is complete, the **Agilent IO Libraries have been successfully installed** screen appears. Click **Finish** to complete the process.

7 Remove the CD from the CD-ROM drive.


InstallShield Wizard
Agilent IO Libraries
Agilent IO Libraries version L.02.00.00 has been removed from your system
Finish

Notes:

3

Agilent IO Libraries Description

Agilent IO Libraries Description

This chapter provides a description of the Agilent IO Libraries components, shows items created during installation, and lists system requirements for the Agilent IO Libraries, including:

- Agilent IO Libraries Components
- Agilent IO Libraries Items Created
- Agilent IO Libraries System Information

Agilent IO Libraries Components

The Agilent IO Libraries software consists of two libraries and four IO configuration utilities.

- Libraries
  - *Agilent Virtual Instrument Software Architecture (VISA)*
  - *Agilent Standard Instrument Control Library (SICL)*
- IO Configuration Utilities
  - *IO Config*
  - *VISA Assistant*
  - *VXI Resource Manager*
  - *LAN Server*

NOTE

Since VISA and SICL are different libraries, using VISA functions and SICL functions in the same IO application is not supported.

Agilent VISA Description

Agilent Virtual Instrument Software Architecture (VISA) is an IO library that can be used to develop IO applications and instrument drivers that comply with the VXI*plug&play* standards. Applications and instrument drivers developed with VISA can execute on VXI*plug&play* system frameworks that have the VISA IO layer. Therefore, software from different vendors can be used together on the same system.

Use VISA if you want to use VXI*plug&play* instrument drivers in your applications, or if you want the IO applications or instrument drivers that you develop to be compliant with VXI*plug&play* standards. If you are using new instruments or are developing new IO applications or instrument drivers, we recommend you use Agilent VISA.

VISA Support

The 32-bit version of VISA is supported on this version of the Agilent IO Libraries for Windows 98/Me/NT/2000/XP Professional. Support for the 16-bit version of VISA was removed in version H.01.00. However, versions through G.02.02 support 16-bit VISA. C, C++, and Visual Basic (up to version 6.0) are supported on all these Windows versions.

VISA Users

VISA has two specific types of users. The first type is the instrumentation end user who wants to use VXI*plug&play* instrument drivers in his or her applications. The second type of user is the instrument driver or IO application developer who wants to be compliant with VXI*plug&play* standards.

Software development using VISA is intended for instrument IO and C/C++ or Visual Basic programmers who are familiar with Windows 98/Me/2000/NT/XP Professional. To perform VISA installation and configuration on Windows NT, you must have system administration privileges on the Windows NT system.

VISA Documentation

This table shows associated documentation you can use when programming with Agilent VISA.

Document	Description
Agilent VISA User's Guide	Shows how to use Agilent VISA and provides the VISA language reference.
VISA Online Help	Information is provided in the form of Windows Help.
VISA Example Programs	Example programs are provided online to help you develop VISA applications.
VXI*plug&play* System Alliance *VISA Library Specification 4.3*	Specifications for VISA.
IEEE Standard Codes, Formats, Protocols, and Common Commands	ANSI/IEEE Standard 488.2-1992.
VXIbus Consortium specifications (when using VISA over LAN)	*TCP/IP Instrument Protocol Specification* - VXI-11, Rev. 1.0 *TCP/IP-VXIbus Interface Specification* - VXI-11.1, Rev. 1.0 *TCP/IP-IEEE 488.1 Interface Specification* - VXI-11.2, Rev. 1.0 *TCP/IP-IEEE 488.2 Instrument Interface Specification* - VXI-11.3, Rev. 1.0

Agilent SICL Description

Agilent Standard Instrument Control Library (SICL) is an IO library developed by Agilent that is portable across many IO interfaces and systems. IO applications using this library can be ported at the source code level from one system to another with few (or no) changes. You can use Agilent SICL if you have been using SICL and want to remain compatible with software currently implemented in SICL.

SICL Support

The 32-bit version of SICL is supported on this version of the Agilent IO Libraries for Windows 98/Me/NT/2000/XP Professional. Support for the 16-bit version of SICL was removed in version H.01.00. However, versions through G.02.02 support 16-bit SICL. C, C++, and Visual Basic are supported on all these Windows versions.

SICL Users

SICL is intended for instrument IO and C/C++ or Visual Basic programmers who are familiar with Windows 98/Me/2000/NT/XP Professional. To perform SICL installation and configuration on Windows NT, you must have system administration privileges on the Windows NT system.

SICL Documentation

This table shows associated documentation you can use when programming with Agilent SICL.

Document	Description
Agilent SICL User's Guide for Windows	Shows how to use Agilent SICL and provides the SICL language reference.
SICL Online Help	Information is provided in the form of Windows Help.
SICL Example Programs	Example programs are provided online to help you develop SICL applications.
VXIbus Consortium specifications (when using VISA over LAN)	*TCP/IP Instrument Protocol Specification* - VXI-11, Rev. 1.0 *TCP/IP-VXIbus Interface Specification* - VXI-11.1, Rev. 1.0 *TCP/IP-IEEE 488.1 Interface Specification* - VXI-11.2, Rev. 1.0 *TCP/IP-IEEE 488.2 Instrument Interface Specification* - VXI-11.3, Rev. 1.0

IO Config Description

The IO Config utility is used by the Agilent IO Libraries to configure instrument IO hardware interfaces. An interface must be configured with IO Config before the interface can be used with the IO Libraries. You can configure all available interfaces with IO Config for use with the Agilent IO Libraries. With IO Config, you can also add, edit, or remove configuration entries for the interface(s) you specify.

IO Config is an interactive program that searches your system for installed interfaces that VISA and SICL support. You select the interface(s) you want to configure and IO Config selects default parameters required to configure the interface(s).

You can run IO Config at any time. However, you must first install an interface card in your system before you can configure the interface. IO Config will verify that an interface card is installed before a configuration entry will be added for the card.

You must have system administrator privileges on Windows NT/2000/XP to run IO Config. You may also need to reboot the computer if you add or modify interfaces with IO Config to load or update driver files for specific interfaces in the Windows kernel. IO Config will inform you if it is necessary to reboot your computer.

VISA Assistant Description

VISA Assistant is an application program that uses the Agilent IO Libraries to communicate with and to control VXI, GPIB, and serial Instruments.

VISA Assistant can automatically detect and assign VXI*plug&play* instrument drivers to instruments. VISA Assistant can also be used to send and receive strings to instruments which support formatted IO. For other instruments, VISA Assistant allows you to read and write memory areas. VISA Assistant also describes attributes that are associated with an instrument.

VXI Resource Manager Description

If your system includes an E8491 IEEE-1394 PC Link to VXI interface, you can view the output of the VXI Resource Manager to determine if your system is properly configured. The easiest way to view this output is to use the IO Config utility to run the VXI Resource Manager.

The VXI Resource Manager initializes and prepares the VXI system for use. The VXI Resource Manager will run when:

- VXI mainframe power is applied or cycled
- The E8491 **Reset** button is pressed
- It is activated from the IO Config utility
- It is activated from the Agilent IO Libraries Control icon
- The computer is rebooted

In VXI systems with multiple E8491s, individual mainframes can be turned off without affecting other mainframes in the system. When a mainframe is turned on, the VXI Resource Manager reconfigures the mainframe.

LAN Server Description

If you configured the LAN server on your system using IO Config, you must now start the LAN server process on the system. To start the LAN server, you can *either* restart (reboot) your system now or manually start the LAN server process on your system.

On Windows NT/2000/XP, the LAN Server must be started manually or you must place a shortcut to it in the Windows Startup folder to have it start when you log in.

Agilent IO Libraries Items Created

During the Agilent IO Libraries installation, SICL and/or VISA and the IO configuration utilities are installed and several program icons are created. In addition, an Agilent IO Libraries Control is created.

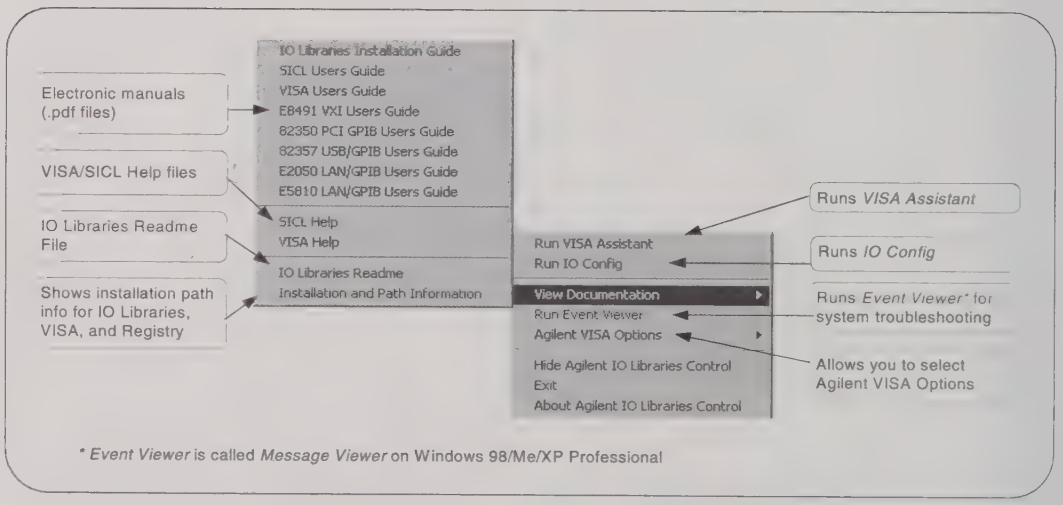
Agilent IO Libraries Control Icon

During installation, an Agilent IO Libraries Control icon is created. This icon is located on the Windows taskbar and is shown as a blue **IO** symbol. A typical display follows when **View Documentation** is selected.

Clicking **View Documentation** | **Installation and Path Information** displays the IO Libraries, VISA, and Registry installation paths. This is primarily useful for troubleshooting installation problems.

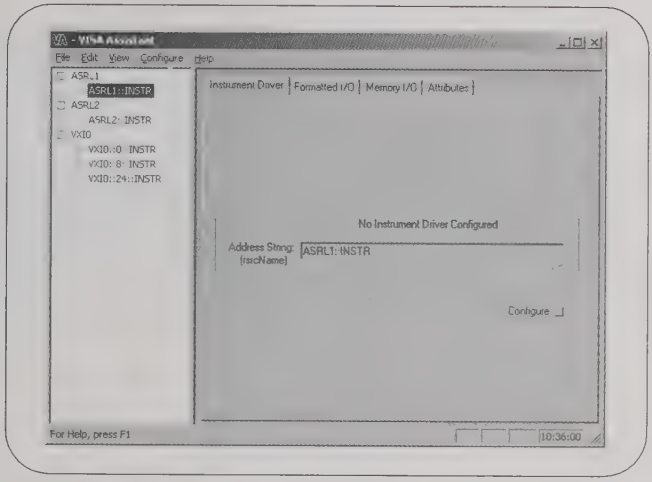
NOTE

If the IO Libraries Control icon is not visible, you can display the icon by clicking ***Start*** *|* ***Programs*** *|* ***Agilent IO Libraries*** *|* ***IO Control***


Electronic manuals (.pdf files)
VISA/SICL Help files
IO Libraries Readme File
Shows installation path info for IO Libraries, VISA, and Registry
IO Libraries Installation Guide
SICL Users Guide
VISA Users Guide
E8491 VXI Users Guide
82350 PCI GPIB Users Guide
82357 USB/GPIB Users Guide
E2050 LAN/GPIB Users Guide
E5810 LAN/GPIB Users Guide
SICL Help
VISA Help
IO Libraries Readme
Installation and Path Information
Run VISA Assistant
Run IO Config
View Documentation
Run Event Viewer
Agilent VISA Options
Hide Agilent IO Libraries Control
Exit
About Agilent IO Libraries Control
Runs VISA Assistant
Runs IO Config
Runs Event Viewer* for system troubleshooting
Allows you to select Agilent VISA Options
* Event Viewer is called Message Viewer on Windows 98/Me/XP Professional

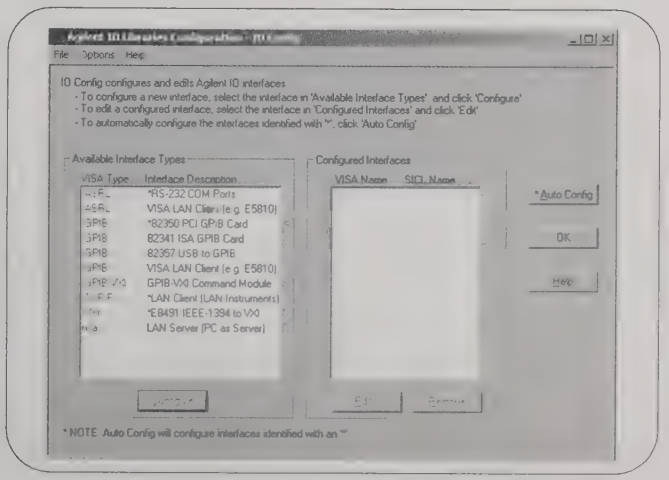
Run VISA Assistant

Clicking the IO icon and then clicking **Run VISA Assistant** displays the VISA Assistant main screen. See "Using VISA Assistant" in *Chapter 4 - Using IO Configuration Utilities* for details on VISA Assistant.



Run IO Config

Clicking the IO icon and then clicking **Run IO Config** displays the IO Config main screen. See "Using IO Config" in *Chapter 4 - Using IO Configuration Utilities* for details on the IO Config utility.


File Options Help
IO Config configures and edits Agilent IO interfaces
· To configure a new interface, select the interface in 'Available Interface Types', and click 'Configure'
· To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
· To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type
Interface Description
*RS-232 COM Ports
VISA LAN Client (e.g. E5810)
*82350 PCI GPIB Card
82341 ISA GPIB Card
82357 USB to GPIB
VISA LAN Client (e.g. E5810)
GPIB-VXI Command Module
*LAN Client (LAN Instruments)
*E8491 IEEE-1394 to VXI
LAN Server (PC as Server)
Configured Interfaces
VISA Name
SICL Name
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

View Documentation

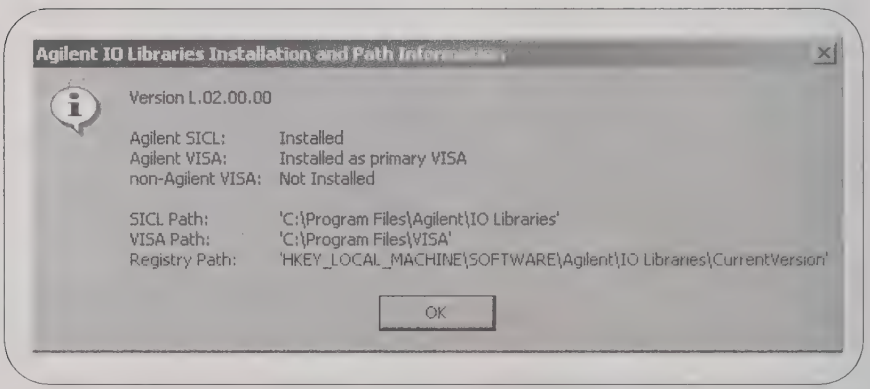
Clicking the IO icon and then clicking **View Documentation** displays four types of documentation: Electronic (PDF) manuals, Help Files, IO Libraries Readme, and Installation and Path Information.

- **Electronic (PDF) Files.** If Adobe Acrobat Reader is installed on your PC, clicking the applicable line displays a .pdf version of the manual selected. For example, clicking **VISA Users Guide** displays a .pdf version of the *Agilent VISA User's Guide.*

NOTE

Adobe Acrobat Reader is required to view manuals available from the Agilent IO Libraries Control. (Online Help files and the Readme file do not require Acrobat Reader.) If Adobe Acrobat Reader is not present, no error message appears, but manuals will not be displayed.

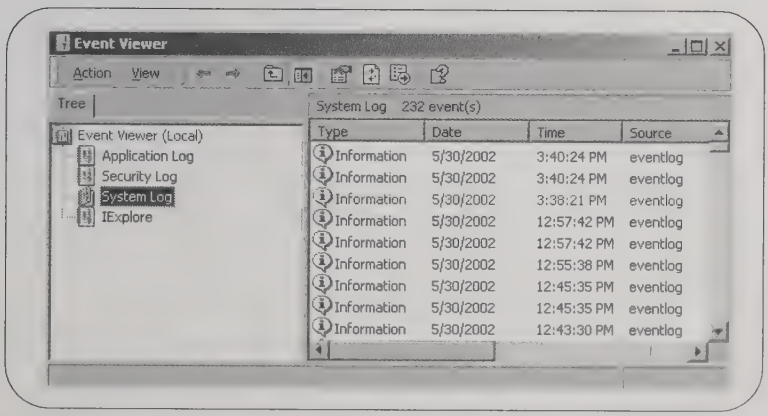
- **Help Files.** Clicking the applicable line displays the online Help file for Agilent VISA or Agilent SICL. Adobe Acrobat Reader is not required to view the Help files.
- **IO Libraries Readme**. Clicking **IO Libraries Readme** displays the Agilent IO Libraries General Information (Readme file) for the current release. Consult the Readme file for the latest information on your version of the Agilent IO Libraries.
- Installation and Path Information. Clicking **Installation and Path Information** displays the **Agilent IO Libraries Installation and Path Information** dialog box. A typical dialog box follows.


Agilent IO Libraries Installation and Path Information
Version L.02.00.00
Agilent SICL: Installed
Agilent VISA: Installed as primary VISA
non-Agilent VISA: Not Installed
SICL Path: 'C:\Program Files\Agilent\IO Libraries'
VISA Path: 'C:\Program Files\VISA'
Registry Path: 'HKEY_LOCAL_MACHINE\SOFTWARE\Agilent\IO Libraries\CurrentVersion'
OK

Run Event Viewer

Clicking the IO icon and then clicking **Run Event Viewer** displays the Windows Event Viewer that you can use to troubleshoot your system.

> **NOTE**
>
> *SICL messages (including messages logged from VISA) may appear in both the Application Log and System Log sections of the Event Viewer.*



Agilent VISA Options

Clicking the IO icon and then clicking **Agilent VISA Options** displays **VISA Logging** and **Default VISA LockWait**.

VISA Logging. VISA Logging has three options:

- **Off:** (Default)
- **Event Viewer:** For Windows NT/2000/XP Professional, messages are logged to the Windows NT/2000 Event Viewer. (For Windows 98/Me, messages are logged to the Message Viewer application.)
- **Debug Window:** Messages are logged using Windows OutputDebugString(). (This is useful in debuggers.)

Default VISA LockWait. This sets the default value for the Agilent-specific VISA ViBoolean local (per-session) attribute **VI_AGATTR_LOCKWAIT**. When a lock-abiding VISA call is made on a session to an exclusively locked resource:

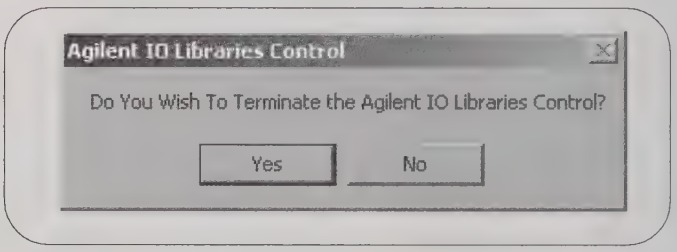
- If **VI_AGATTR_LOCKWAIT** is **VI_FALSE** (Default VISA LockWait **False** is checked), the call will immediately return with **VI_ERROR_RSRC_LOCKED**.
- If **VI_AGATTR_LOCKWAIT** is **VI_TRUE** (Default VISA LockWait **True** is checked), the call will wait the session timeout interval for the lock to be released and then return **VI_ERROR_TMO** rather than **VI_ERROR_RSRC_LOCKED**.

Hide Agilent IO Libraries Control

Clicking the IO icon and then clicking **Hide Agilent IO Libraries Control** causes the blue IO icon to disappear from the Windows taskbar. You can restore the IO icon to the taskbar by clicking **Start | Programs | Agilent IO Libraries | IO Control**

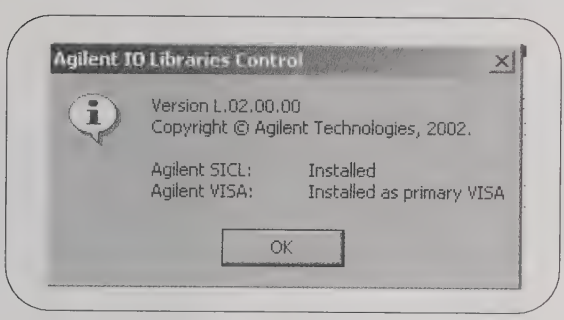
Exit

Clicking the IO icon and then clicking `Exit` displays the **Agilent IO Libraries Control** dialog box. Click **Yes** to terminate the IO Control and cause the blue IO icon to disappear from the Windows taskbar. You can restore the IO icon to the taskbar by clicking **Start | Programs | Agilent IO Libraries | IO Control**



About Agilent IO Libraries Control

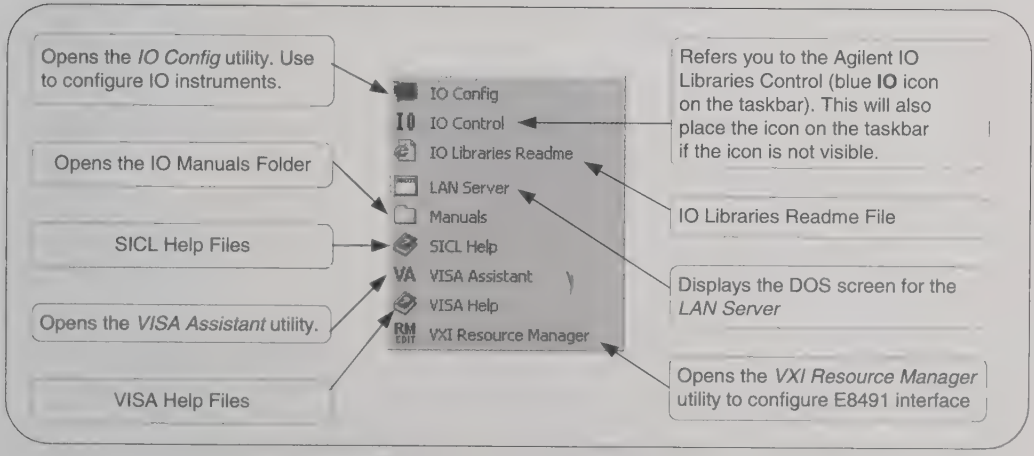
Clicking the IO icon and then clicking **About Agilent IO Libraries Control** displays the **Agilent IO Libraries Control** dialog box that displays the currently installed version of the libraries and shows whether or not Agilent SICL and/or Agilent VISA are installed. For example, this dialog box shows the Version L.02.00.00 is installed, Agilent SICL is installed, and Agilent VISA is installed as the primary VISA.



Program Groups Created

During installation, the Agilent IO Libraries program group is created. After the libraries are installed, to access this group click **Start | Programs | Agilent IO Libraries** to display the following icons.

Three utilities are installed you can use with the IO Libraries: IO Config, VISA Assistant, and VXI Resource Manager. See *Chapter 4 - Using IO Configuration Utilities* for information on using these utilities.

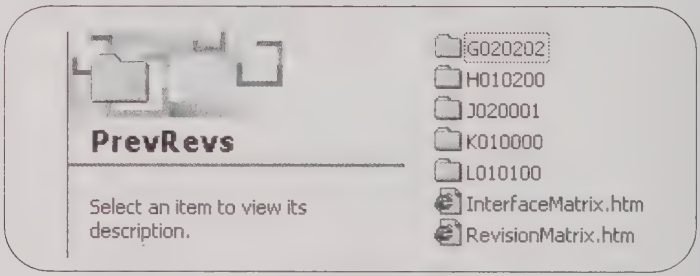

Opens the *IO Config* utility. Use to configure IO instruments.
Opens the IO Manuals Folder
SICL Help Files
Opens the *VISA Assistant* utility.
VISA Help Files
IO Config
IO Control
IO Libraries Readme
LAN Server
Manuals
SICL Help
VISA Assistant
VISA Help
VXI Resource Manager
Refers you to the Agilent IO Libraries Control (blue **IO** icon on the taskbar). This will also place the icon on the taskbar if the icon is not visible.
IO Libraries Readme File
Displays the DOS screen for the *LAN Server*
Opens the *VXI Resource Manager* utility to configure E8491 interface

Access to Previous Versions

The *Agilent IO Libraries for Instrument Control* CD also includes previous versions of the Agilent IO Libraries.

What's in the Previous Versions Directory?

For example, as shown in the following figure, the L.02.00 version of the CD includes previous versions L.01.01, G.02.02.02, H.01.02.00, J.02.00.01, and K.01.00.00. The directory also includes information on supported interfaces and previous revision history.



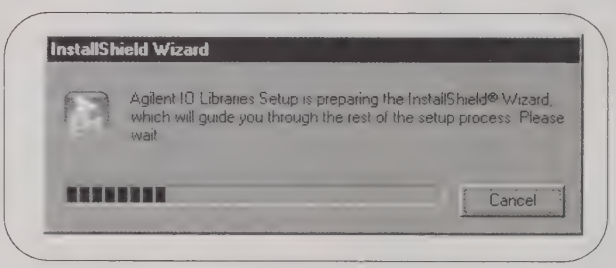
Installing a Previous Version to Your PC

To install a previous version of the Agilent IO Libraries on your PC:

1. Turn the PC ON, insert the *Agilent IO Libraries for Instrument Control* CD into the CD-ROM drive, and wait a few seconds for the application to run.

2. The installer should automatically start when the CD is inserted. If not, click **Start** | **Run** and type **<*drive*>:setup.exe**, where ***drive*** is your CD-ROM drive.

3. The InstallShield® Wizard appears to begin the Agilent IO Libraries installation. **Immediately** click the **Cancel** button to stop the installation.


InstallShield Wizard
Agilent IO Libraries Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

4. Uninstall the currently installed version of the Agilent IO Libraries. (You cannot install an earlier version of the libraries over a later version.)

5. Open your Windows Explorer and navigate to *<drive> \ PrevRevs \ <version>*, where *version* is the version (G020202, H010200, etc.) that you want to copy.

6. Run the Setup.exe program from that directory.

7. Remove the *Agilent IO Libraries for Instrument Control* CD from the CD-ROM drive.

Agilent IO Libraries System Information

This section describes Agilent IO Libraries minimum system requirements, supported interfaces, and previous revisions information. You should verify that your system meets the minimum requirements shown and the system interfaces are supported before you install the Agilent IO Libraries.

Minimum System Requirements

The following table summarizes **minimum** hardware and software requirements to install and use the Agilent IO Libraries. Adding additional RAM may improve overall system performance.

Item	Minimum Requirements
Hardware Requirements	
PC Operation/Memory	100 MHz operation and 64 Mb RAM
PC Plug-in Slots	EISA I/O slots for GPIB or RS-232 interface or for a LAN adapter. PCI slots for GPIB (PCI) and IEEE-1394 interfaces.*
Software Requirements	
Operating System	Windows 98/Me/2000/NT/XP Professional
IO Library Installation Sizes	- Core Installation (LAN and ASRL only) 5 Mb - Runtime Installation (adds hw drivers) 9 Mb - Full Installation (without manuals) 14 Mb - Full Installation (with manuals) 34 Mb - Add Adobe Acrobat Reader (version 5.05) 11 Mb addl

*If you use an RS-232 interface with VISA and SICL, see the RS-232 documentation for your Windows product, since VISA and SICL use the RS-232 capabilities built into Windows.

Agilent IO Libraries Supported Interfaces

This table shows the version of the Agilent IO Libraries recommended for each I/O interface and operating system used for 32-bit applications (16-bit applications are not supported).

Interface		Windows Operating System			
Type	**Product**	**XP Pro**	**2000**	**NT 4.0**	**NT 3.51**
USB	82357A GPIB	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	No	No
PCI	82350A GPIB	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	No
LAN	E5810A GPIB RS-232	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	No
	E2050A/B GPIB	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	G.02.02
ISA	82341C GPIB	No	L.02.00	L.02.00	G.02.02
	82335B GPIB	No	No	No	No
	82341D GPIB	No	No	No	No
	E2075A GPIO	No	K.01.00 SICL Only	K.01.00 SICL Only	G.02.02 SICL Only
Serial	RS-232	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	G.02.02
VXI	E1406A GPIB	L.02.00	L.02 00	L.02.00	G.02.02
	E8491A/B IEEE-1394	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	No
	E623x Embedded Pentium	No	No	G.02.02 or H.01.02	No
	E985x Embedded Pentium	No	No	H.01.03	No

Interface		Windows Operating System			
Type	**Product**	**Me**	**98**	**95**	**3.1**
USB	82357A GPIB	L.02.00	L.02.00	No	No
PCI	82350A GPIB	L.02.00	L.02.00	K.01.00	No
LAN	E5810A GPIB RS-232	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	No
	E2050A/B GPIB	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	L.02.00 Single or Dual CPU	G.02.02
ISA	82341C GPIB	No	L.02.00	K.01.00	B.03.13
	82335B GPIB	No	No	G.02.02 SICL Only, Not Recommended	B.01.03
	82341D GPIB	No	No	J.02.00	No
	E2075A GPIO	No	K.01.00 SICL Only	K.01.00 SICL Only	B.03.13 SICL Only
Serial	RS-232	L.02.00	L.02.00	K.01.00	B.03.13
VXI	E1406A GPIB	L.02.00	L.02.00	K.01.00	B.03.13
	E8491A/B IEEE-1394	L.02.00	L.02.00	K.01.00	No
	E623x Embedded Pentium	No	No	G.02.02 or H.01.02	No
	E985x Embedded Pentium	No	No	No	No

Agilent IO Libraries Revisions

This table summarizes major Agilent IO Libraries revisions with their supported interfaces and Windows operating systems.

IO Libraries Revision	Windows Operating Systems	Supported Interfaces	See Note
L.02.00	98 SE Me NT 4.0 2000 XP Pro	82341C ISA GPIB Interface (Win 98 SE, NT 4.0, 2000 only) 82350A PCI GPIB Interface 82357A USB/GPIB Interface E2050A/B LAN/GPIB Gateway E1406A VXI Command Module (GPIB) E5810A LAN/GPIB Gateway E8491B VXI IEEE 1394 Slot 0 (FireWire) RS-232	L.02.00
L.01.01	98 SE Me NT 4.0 2000 XP Pro	82341C ISA GPIB Interface (Win 98 SE, NT 4.0, 2000 only) 82350A PCI GPIB Interface 82357A USB/GPIB Interface E2050A/B LAN/GPIB Gateway E1406A VXI Command Module (GPIB) E5810A LAN/GPIB Gateway E8491B VXI IEEE 1394 Slot 0 (FireWire) RS-232	L.01.01
L.01.00	98 SE Me NT 4.0 2000 XP Pro	82341C ISA GPIB Interface (Win 98 SE, NT 4.0, 2000 only) 82350A PCI GPIB Interface 82357A USB/GPIB Interface E2050A/B LAN/GPIB Gateway E1406A VXI Command Module (GPIB) E8491B VXI IEEE 1394 Slot 0 (FireWire) RS-232	L.01.00
K.01.00	95 98 98 SE Me NT 4.0 2000	82341C ISA GPIB Interface (no Windows Me support) 82350A PCI GPIB Interface E2050A/B LAN/GPIB Gateway E2075A GPIO Interface (no Windows Me support) E1406A VXI Command Module (GPIB) E8491B VXI IEEE 1394 Slot 0 (FireWire) RS-232	K.01.00

IO Libraries Revision	Windows Operating Systems	Supported Interfaces	See Note
J.02.00	95 98 98 SE Me NT 4.0 2000	82341C ISA GPIB Interface (no Windows Me support) 82341D ISA GPIB Interface (Windows 95 only) 82350A PCI GPIB Interface E2050A/B LAN/GPIB Gateway E2075A GPIO Interface (no Windows Me support) E1406A VXI Command Module (GPIB) E8491B VXI IEEE 1394 Slot 0 (FireWire) RS-232	J.02.00
H.01.02 or H.01.03 (ships with E985x controllers)	95 98 NT 4.0	82341C ISA GPIB Interface 82341D ISA GPIB Interface (Windows 95 only) 82350A PCI GPIB Interface E2050A/B LAN/GPIB Gateway E2075A GPIO Interface E1406A VXI Command Module (GPIB) E8491A/B VXI IEEE 1394 Slot 0 (FireWire) VXI Embedded Controllers RS-232	H.01.02
G.02.02	95 98 NT 3.51 NT 4.0	82341C ISA GPIB Interface 82341D ISA GPIB Interface (Windows 95 only) 82350A PCI GPIB Interface E2050A/B LAN/GPIB Gateway E2075A GPIO Interface E1406A VXI Command Module (GPIB) E8491A VXI IEEE 1394 Slot 0 (FireWire) VXI Embedded Controllers RS-232	G.02.02
B.03.13 (available on G.02.02 CD)	3.1	82335B ISA GPIB Interface 82341C ISA GPIB Interface E2075A GPIO Interface E1406A VXI Command Module (GPIB) RS-232	

Notes	
L.02.00	**Added Support:** ■ Agilent T&M Programmer's Toolkit for VisualStudio.NET ■ VISA Locking on TCPIP
L.01.01	**Added Support:** ■ E5810A LAN/GPIB Gateway
L.01.00	**Added Support:** ■ Windows XP Professional ■ 82357A USB/GPIB Interface **No Longer Supports:** ■ Windows 95 ■ E2075A GPIO
K.01.00	**Added Support:** ■ Single or dual processor support for 82350A, E2050A/B and RS-232 on Windows NT/2000 ■ VISA 2.2 ■ NI-488 interface cards **No Longer Supports**: ■ 82341D GPIB
J.02.00	**Added Support:** ■ Windows 2000 ■ Windows Me (no support for ISA Interfaces) ■ VISA 1.1 ■ Tested 1394 Cardbus cards **Changes:** ■ Default paths for IO Libraries have changed
H.01.02	**Added Support:** ■ Single or dual processor support of E8491A/B **No Longer Supports:** ■ Windows 3.1 and NT 3.51 ■ 16-bit applications on Windows 95 and 98
G.02.02	**Added Support:** ■ Windows 98 ■ Single or dual processor support of E8491A

Notes:

4

Using IO Configuration Utilities

Using IO Configuration Utilities

This chapter gives guidelines to use Agilent IO utilities to configure IO interfaces, including:

- Getting Started
- Using IO Config
- Using VISA Assistant
- Using VXI Resource Manager
- Using LAN Server

NOTE

In most cases, you can open and run the IO Config utility and use the default choices for your specific interface. If you have questions about interface configuration or you want to change the interface settings, see Chapter 5 - Configuring I/O Interfaces.

Getting Started

Depending on the hardware interfaces in your system, you can use one or more IO utilities to configure the Agilent IO Libraries for your system. This section shows how to get started using these utilities.

NOTE

If you have multiple operating systems on your PC, you will need to install and configure the Agilent IO Libraries on each operating system to be used for I/O programming.

Before you can use an IO interface with SICL or VISA, you must first configure the interface with the IO Config utility (located in the *Agilent IO Libraries* program folder). IO Config should be used exclusively to configure all interfaces used with SICL and VISA. To get started using the IO Configuration utilities:

1. Determine the IO interfaces for your system (GPIB, VXI, LAN, etc.).
2. As required, see the applicable section in *Chapter 5 - Configuring I/O Interfaces* for guidelines to configure the interface(s). For example, see "Configuring GPIB Interfaces" for GPIB interfaces, etc.
3. See "Using IO Config" in this chapter for guidelines to use the IO Config utility to configure interfaces.
4. As required, see "Using VISA Assistant", "Using VXI Resource Manager", or "Using LAN Server" for configuration information.
5. See the *Agilent VISA User's Guide for Windows* for information on VISA commands. See the *Agilent SICL User's Guide for Windows* for details on SICL commands. After the Agilent IO Libraries are installed, these manuals are available in electronic form from the blue IO icon on the Windows taskbar. Click the icon and then click **View Documentation**.

Using IO Config

This section gives guidelines to use the IO Libraries configuration utility IO Config. You can use IO Config to configure hardware interfaces (such as an 82350A GPIB card, etc.) for use with VISA and SICL on a PC with Windows 98/Me/2000/NT/XP Professional.

NOTE

We recommend exiting all VISA and SICL applications before running IO Config.

IO Config Requirements

The IO Config utility is used by the Agilent IO Libraries to configure instrument IO hardware interfaces. An interface must be configured with IO Config before the interface can be used with the IO Libraries. You can configure all available interfaces with IO Config for use with the Agilent IO Libraries. With IO Config, you can also add, edit, or remove configuration entries for the interface(s) you specify.

IO Config is an interactive program that searches your system for installed interfaces that VISA and SICL support. You select the interface(s) you want to configure and IO Config selects default parameters required to configure the interface(s).

You can run IO Config at any time. However, you must first install an interface card in your system before you can configure the interface. IO Config will verify that an interface card is installed before a configuration entry will be added for the card.

You must have system administrator privileges on Windows NT/2000/XP to run IO Config. You may also need to reboot the computer if you add or modify interfaces with IO Config to load or update driver files for specific interfaces in the Windows kernel. IO Config will inform you if it is necessary to reboot your computer.

When you configure VISA with IO Config, the default configuration is to identify all VISA devices at application runtime. If you experience slow performance and/or timeouts when running VISA applications, you may want to edit the VISA configuration and uncheck the **Identify devices at runtime** box.

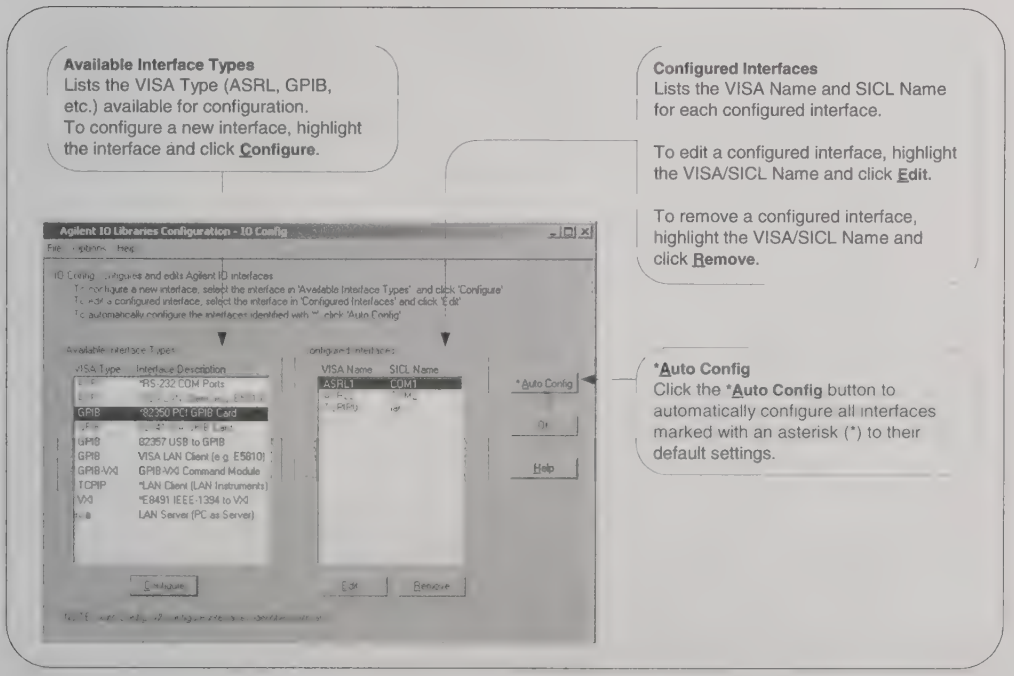
Running IO Config

The purpose of IO Config is to configure an I/O interface for use with VISA or SICL. IO Config does this by associating a unique VISA and/or SICL name with a hardware interface. You can use IO Config to configure new interfaces and/or edit or remove configured interfaces.

The IO Libraries use an **Interface Name** or **Logical Unit Number** to identify an interface. This information is passed in the parameter string of the **`viOpen`** function call in a VISA program or in the **`iopen`** function call in a SICL program. IO Config assigns an Interface Name and Logical Unit Number to the interface hardware, as well as other necessary configuration values for an interface when the interface is configured.

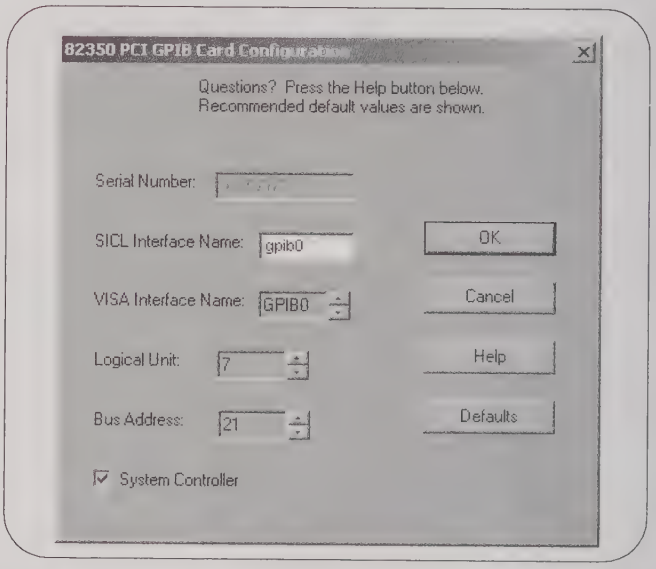
Open IO Config

Open IO Config by double-clicking the **IO Config** icon in the *IO Libraries* program group or by clicking the **Agilent IO Libraries Control** icon (blue IO icon on the Windows taskbar) and then selecting **Run IO Config.** The following figure shows a typical display with three configured interfaces.


Available Interface Types
Lists the VISA Type (ASRL, GPIB, etc.) available for configuration.
To configure a new interface, highlight the interface and click **Configure**.
Configured Interfaces
Lists the VISA Name and SICL Name for each configured interface.
To edit a configured interface, highlight the VISA/SICL Name and click **Edit**.
To remove a configured interface, highlight the VISA/SICL Name and click **Remove**.
***Auto Config**
Click the ***Auto Config** button to automatically configure all interfaces marked with an asterisk (*) to their default settings.
Agilent IO Libraries Configuration - IO Config
VISA Type
Interface Description
VISA Name
SICL Name
ASRL1
COM1
GPIB
82350 PCI GPIB Card
GPIB
82357 USB to GPIB
GPIB
VISA LAN Client (e.g. E5810)
GPIB-VXI
GPIB-VXI Command Module
TCPIP
*LAN Client (LAN Instruments)
VXI
*E8491 IEEE-1394 to VXI
LAN Server (PC as Server)
*Auto Config
Help
Configure...
Edit...
Remove

Configuring a New Interface

To use IO Config to configure a new interface, highlight the interface in the **Available Interface Types** box and then click the **Configure** button. The applicable configuration screen then appears. For example, for the previous figure, since **GPIB 82350 PCI GPIB Card** is highlighted, the **82350 PCI GPIB Card Configuration** screen appears after you click the **Configure** button.



When the **82350 PCI GPIB Card Configuration** screen appears, set the VISA and SICL Interface Names and the Logical Unit and Bus Address values, as required. Then, click the **OK** button. If you have more than one 82350 card in your system, repeat for remaining cards. If you have questions about using IO Config for a specific interface, click the **Help** button on the IO Config dialog box.

NOTE

For interfaces marked with an asterisk (*), you can click the ****Auto Config*** *button to automatically configure all marked interfaces to their default values. However, you must manually configure interfaces not marked with an asterisk.*

Editing a Configured Interface

To edit a configured interface, highlight the line with the VISA Name and SICL Name desired and then click the **Edit** button to display the dialog box for the specified interface. Make the changes required on the dialog box and then click **OK** to store the changes.

In most cases, you can use the automatic defaults. However, if you need to change a value, click the arrows next to the value's field. If there are no arrows, click the field and type in the value you want.

Note the name of the interface (such as **`gpib0`**, etc.) and the logical unit number of the interface for use in SICL applications, and the device address for use in VISA applications.

Removing a Configured Interface

To remove a configured interface, highlight the line with the VISA Name and SICL Name desired and then click the **Remove** button to remove the specified interface.

> **NOTE**
>
> *When VISA LAN Client is configured, LAN Client is also automatically configured. Thus, two configured interfaces (such as GPIB0 for VISA LAN Client and TCPIP0 for LAN Client) are displayed. Do NOT delete the LAN Client entry, as the VISA LAN Client interface will not work if you do this. A single LAN Client interface can be used for any number of VISA LAN Client interfaces.*

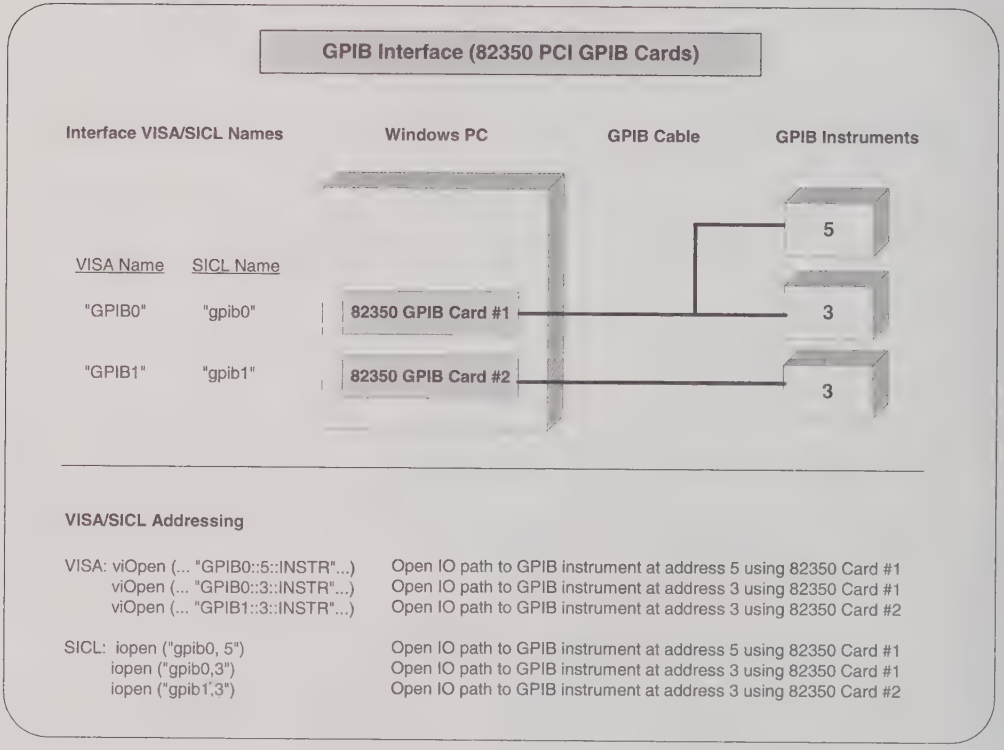
Example: Using IO Config

An **I/O interface** can be defined as both a hardware interface and a software interface. The purpose of the IO Config utility is to associate a unique interface name with a hardware interface.

For example, the GPIB interface system in the following figure consists of a Windows PC with two 82350 GPIB cards connected to three GPIB instruments via GPIB cables. For this system, IO Config was used to assign GPIB card #1 a VISA name of **`GPIB0`** and a SICL name of **`gpib0`**.

IO Config was also used to assign GPIB card #2 a VISA name of "GPIB1" and a SICL name of "gpib1". With these names assigned to the interfaces, the VISA/SICL addressing is as shown in the figure.

Since unique names have been assigned by IO Config, you can use the VISA **`viOpen`** command to open the IO paths to the GPIB instruments as shown in the above figure. Or, you can use the SICL **`iopen`** command to open the IO paths shown.


GPIB Interface (82350 PCI GPIB Cards)
Interface VISA/SICL Names
Windows PC
GPIB Cable
GPIB Instruments
VISA Name
SICL Name
"GPIB0"
"gpib0"
"GPIB1"
"gpib1"
82350 GPIB Card #1
82350 GPIB Card #2
5
3
3
VISA/SICL Addressing
VISA: viOpen (... "GPIB0::5::INSTR"...) Open IO path to GPIB instrument at address 5 using 82350 Card #1
viOpen (... "GPIB0::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82350 Card #1
viOpen (... "GPIB1::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82350 Card #2
SICL: iopen ("gpib0, 5") Open IO path to GPIB instrument at address 5 using 82350 Card #1
iopen ("gpib0,3") Open IO path to GPIB instrument at address 3 using 82350 Card #1
iopen ("gpib1,3") Open IO path to GPIB instrument at address 3 using 82350 Card #2

Using VISA Assistant

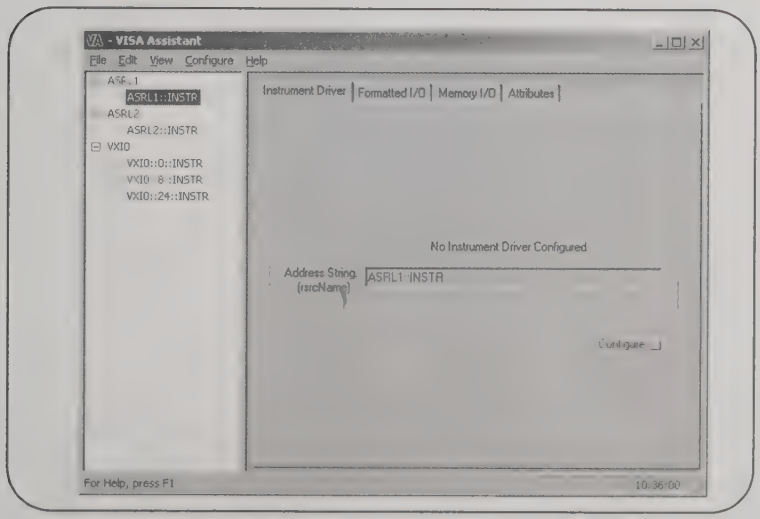
VISA Assistant is an application program that uses the IO Libraries to communicate with, and to control, VXI, GPIB, and serial Instruments.

VISA Assistant Overview

VISA Assistant can automatically detect and assign VXI*plug&play* instrument drivers to instruments. VISA Assistant can also be used to send and receive strings to instruments which support formatted IO. For other instruments, VISA Assistant allows you to read and write memory areas. VISA Assistant also describes attributes that are associated with an instrument.

Running VISA Assistant

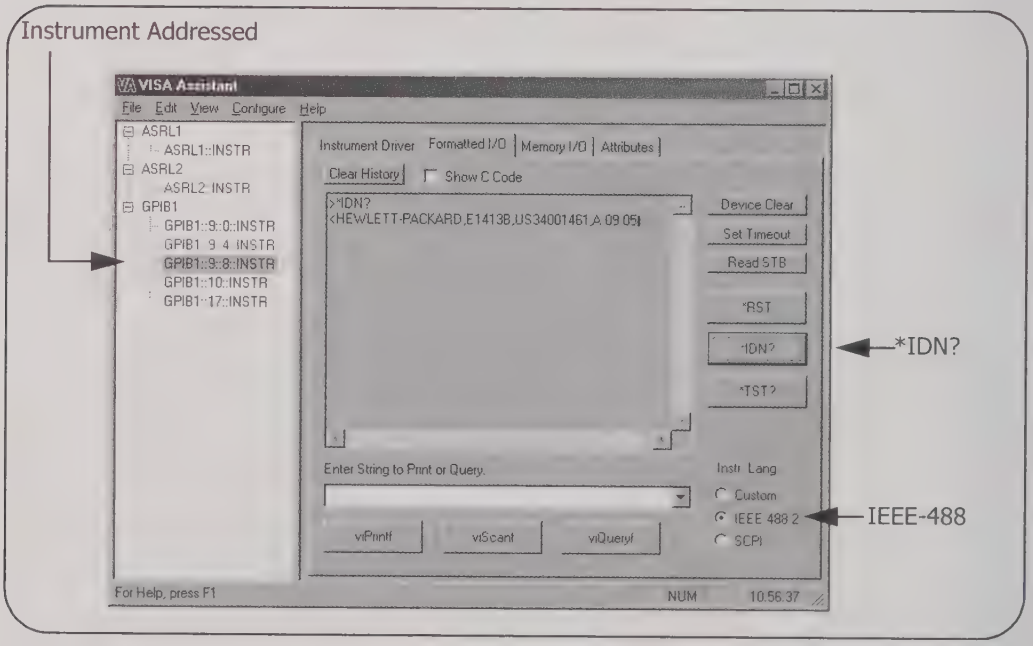
To run VISA Assistant, click **Start** | **Programs** | **Agilent IO Libraries** | **VISA Assistant** or click the **Agilent IO Libraries Control** and then click **Run VISA Assistant.** A typical display showing the system Instrument View follows. For information on using VISA Assistant, click the **Help** menu button.



Example: Using VISA Assistant

After the IO interface has been configured with IO Config, you can use the VISA Assistant utility to establish communication between your PC and system instruments. This example shows one way to use VISA Assistant for communication between your PC and GPIB instruments. To use VISA Assistant for communication:

1. Click the blue IO icon on the Windows taskbar
2. Click **Run VISA Assistant** to display the main screen
3. Maximize the main screen
4. Highlight the GPIB instrument to be addressed
5. Select the **Formatted I/O** tab
6. Select the **IEEE 488-2** button
7. Click the ***IDN?** button
8. The instrument identification string appears
9. Repeat Steps 4 - 8 for the next GPIB instrument



Using the VXI Resource Manager

If your system includes an E8491 IEEE-1394 PC Link to VXI interface, you can view the output of the VXI Resource Manager to determine if your system is properly configured.

VXI Resource Manager Overview

The VXI Resource Manager initializes and prepares the VXI system for use. The VXI Resource Manager will run when:

- VXI mainframe power is applied or cycled
- The E8491 **Reset** button is pressed
- It is activated from Agilent IO Libraries Control icon
- The computer is rebooted

In VXI systems with multiple E8491s, individual mainframes can be turned off without affecting other mainframes in the system. When a mainframe is turned on, the Resource Manager reconfigures the mainframe.

NOTE

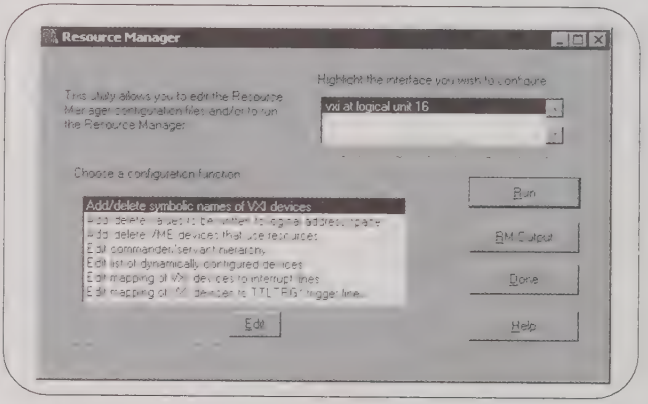
The Agilent IO Libraries Control utility must be running to enable the VXI Resource Manager to run. The VXI Resource Manager is installed when the E8491 interface is configured using IO Config. Click the blue ***IO*** *icon on the taskbar to access the IO Libraries Control utility.*

If the IO Libraries Control icon is not visible, you can display the icon by clicking Start / Programs / Agilent IO Libraries / IO Control. The displays in this section are from Windows 2000. Displays for Windows 98/Me/NT/XP may be slightly different.

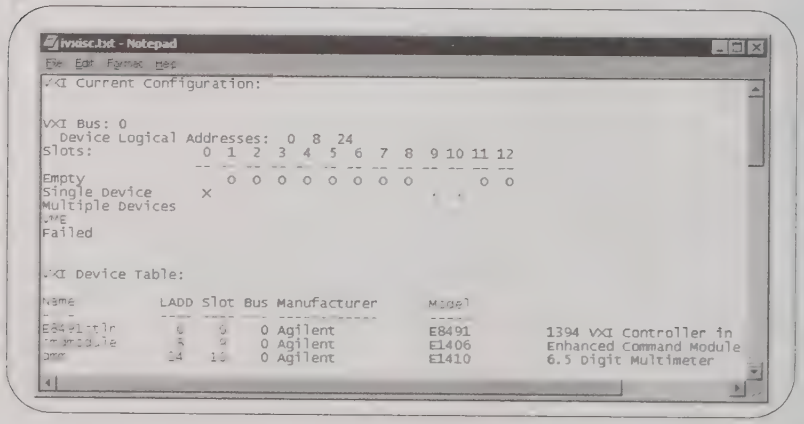
Displaying VXI Resource Manager Output

If an E8491 has previously been installed and configured with IO Config, the VXI Resource Manager will automatically run every time Windows starts. If you change the E8491 configuration in IO Config, the VXI Resource Manager will run automatically (after a 5 second delay) when IO Config is closed.

After the VXI Resource Manager has run, you can view its output. To display the **Resource Manager** screen, click the **Agilent IO Libraries Control** icon on the taskbar and click **Edit VXI Resource Manager**. See the following figure for a typical display.



To view the system configuration (the VXI Resource Manager output), click **RM Output**. The following figure shows a part of a typical display.


ivxisc.txt - Notepad
File Edit Format Help
VXI Current Configuration:
VXI Bus: 0
Device Logical Addresses: 0 8 24
Slots: 0 1 2 3 4 5 6 7 8 9 10 11 12
Empty
Single Device
Multiple Devices
VME
Failed
VXI Device Table:
Name LADD Slot Bus Manufacturer Model
E8491 0 0 0 Agilent E8491 1394 VXI Controller in
E1406 8 9 0 Agilent E1406 Enhanced Command Module
E1410 24 10 0 Agilent E1410 6.5 Digit Multimeter

Using the LAN Server

If you configured the LAN server on this system using IO Config, you must now start the LAN server process on this system.

Starting the LAN Server

- The LAN server will start automatically when Windows boots only for Windows 9X systems. On NT, 2000, and XP Professional, the user must start the LAN server manually or must create a shortcut to the LAN server in the **Start | Programs | Startup** folder for the LAN server to start on boot up.
- To start the LAN server, you can *either* restart (reboot) this system now or manually start the LAN server process on this system.
- To manually start the LAN server process on the system after the LAN server has been configured using IO Config, click the **LAN Server** icon in the *Agilent IO Libraries* program group.
- The LAN server is now running. You can now minimize the LAN Server window so that the LAN Server process is listed on the Windows taskbar.

Stopping the LAN Server

To stop the LAN server process from running on the system:

1. Open the **LAN Server** window on the screen and move the cursor into the **LAN Server** window.
2. Type **Ctrl+C** to close the window. The LAN server process is stopped.

Notes:

5

Configuring I/O Interfaces

Configuring I/O Interfaces

This chapter gives guidelines to configure and address I/O interfaces, including:

- Configuring GPIB Interfaces
- Configuring VXI Interfaces
- Configuring LAN Interfaces
- Configuring ASRL Interfaces

NOTE

See Chapter 4 - Using IO Configuration Utilities for information to use IO Configuration utilities (IO Config, VISA Assistant, VXI Resource Manager, and LAN Server).

See the Agilent VISA User's Guide for details on VISA commands. See the Agilent SICL User's Guide for Windows for details on SICL commands.

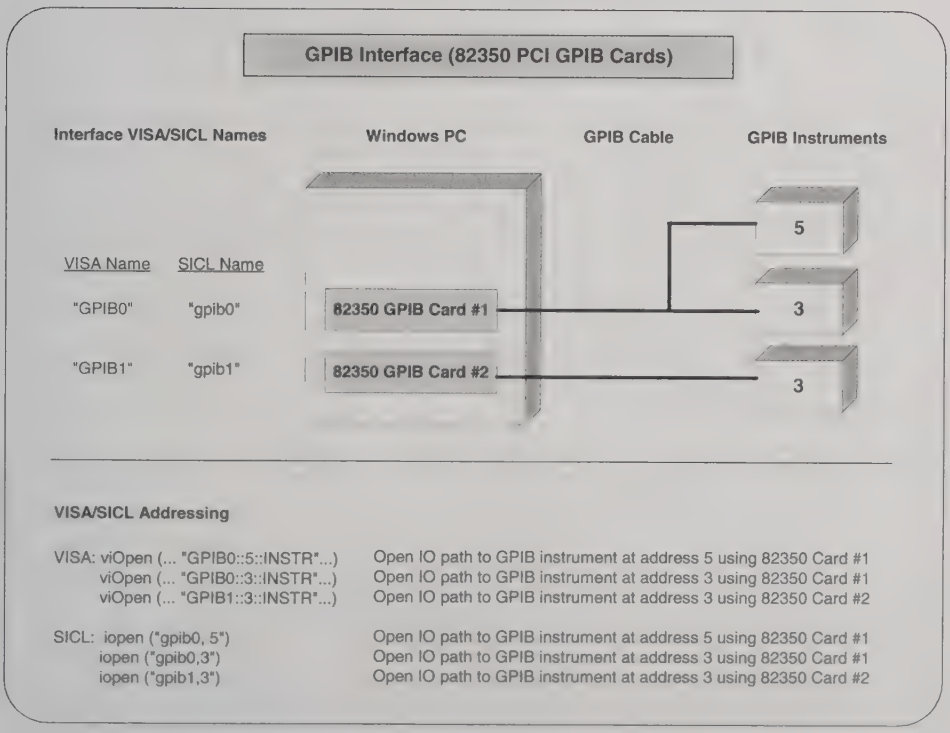
When the Agilent IO Libraries are installed, an electronic version of each document is available by clicking the blue IO icon and selecting ***View Documentation***

Introduction to I/O Interface Configuration

An **I/O interface** can be defined as **both** a hardware interface and a software interface. The purpose of the IO Config utility is to associate a unique software interface name with a hardware interface.

The IO Libraries use an **Interface Name** or **Logical Unit Number** to identify an interface. This information is passed in the parameter string of the **`viOpen`** function call in a VISA program or in the **`iopen`** function call in a SICL program. IO Config assigns an Interface Name and Logical Unit Number to the interface hardware, as well as other necessary configuration values for an interface when the interface is configured.

When the I/O interface is configured, you can use Agilent VISA or Agilent SICL to program assigned instruments. For example, the following figure shows the VISA and SICL addressing for GPIB instruments connected to a PC via a GPIB interface.


GPIB Interface (82350 PCI GPIB Cards)
Interface VISA/SICL Names
Windows PC
GPIB Cable
GPIB Instruments
VISA Name
SICL Name
"GPIB0"
"gpib0"
"GPIB1"
"gpib1"
82350 GPIB Card #1
82350 GPIB Card #2
5
3
3
VISA/SICL Addressing
VISA: viOpen (... "GPIB0::5::INSTR"...) Open IO path to GPIB instrument at address 5 using 82350 Card #1
viOpen (... "GPIB0::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82350 Card #1
viOpen (... "GPIB1::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82350 Card #2
SICL: iopen ("gpib0, 5") Open IO path to GPIB instrument at address 5 using 82350 Card #1
iopen ("gpib0,3") Open IO path to GPIB instrument at address 3 using 82350 Card #1
iopen ("gpib1,3") Open IO path to GPIB instrument at address 3 using 82350 Card #2

Configuring GPIB Interfaces

This section gives guidelines to use the IO Config utility to configure GPIB interfaces, including:

- GPIB Interfaces Overview
- Configuring GPIB (82357 USB) Interfaces
- Configuring GPIB (82350 PCI) Interfaces
- Configuring GPIB (82341 ISA) Interfaces

GPIB Interfaces Overview

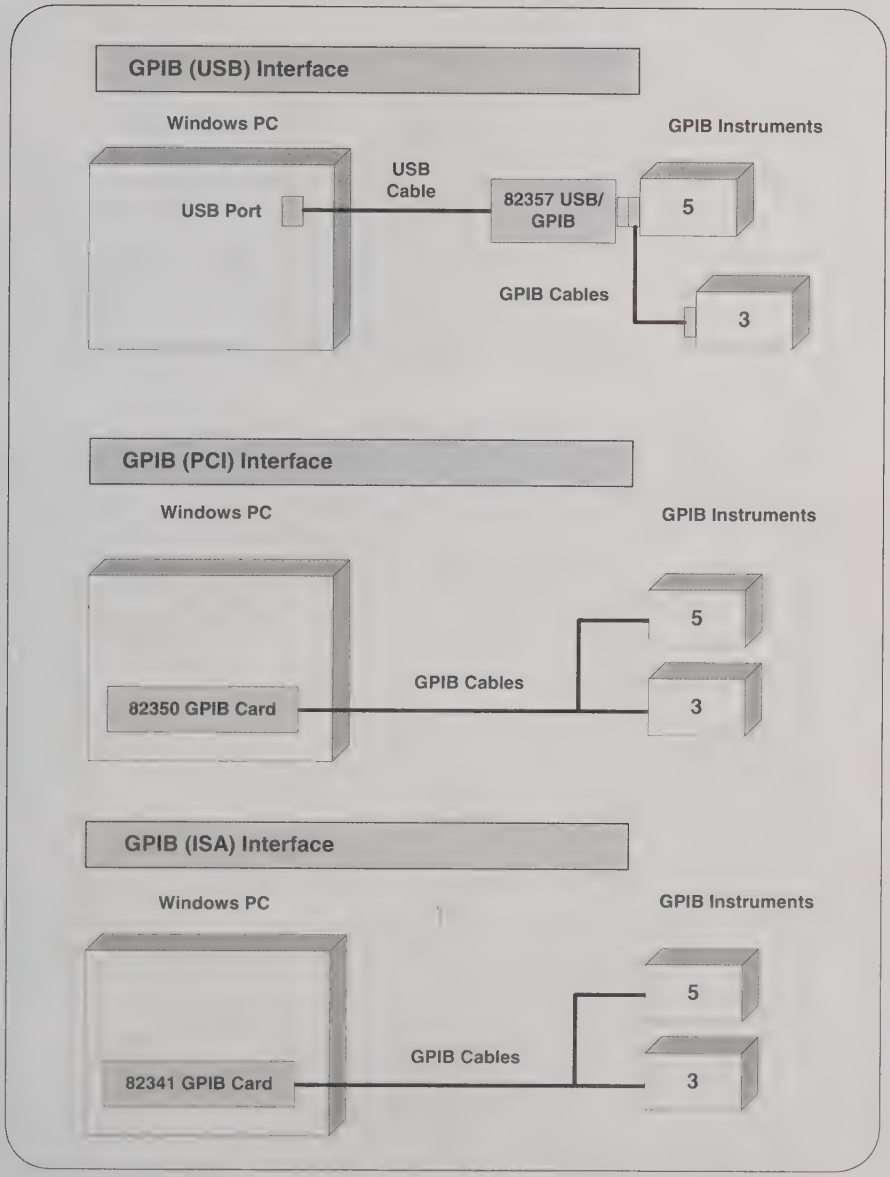
A GPIB interface connects a Windows PC to one or more GPIB instruments. There are three types of GPIB interfaces: USB, PCI, and ISA.

NOTE

*A fourth type of GPIB interface is the **GPIB VISA LAN Client (e.g. 5810)**. This interface is described in "Configuring LAN Interfaces" in this chapter.*

- **USB Interfaces:** For USB interfaces, I/O communication is via a USB port installed in the PC, a USB cable, and a USB/GPIB interface (such as the 82357 USB/GPIB Gateway).
- **PCI Interfaces:** For PCI interfaces, I/O communication is via a PCI GPIB card (such as an 82350) installed in the PC and GPIB cables.
- **ISA Interfaces:** For ISA interfaces, I/O communication is via an ISA GPIB card (such as an 82341) installed in the PC and GPIB cables.

The following figure shows typical GPIB interfaces to GPIB instruments at addresses 3 and 5.


GPIB (USB) Interface
Windows PC
GPIB Instruments
USB Cable
USB Port
82357 USB/ GPIB
5
GPIB Cables
3
GPIB (PCI) Interface
Windows PC
GPIB Instruments
5
82350 GPIB Card
GPIB Cables
3
GPIB (ISA) Interface
Windows PC
GPIB Instruments
5
GPIB Cables
82341 GPIB Card
3

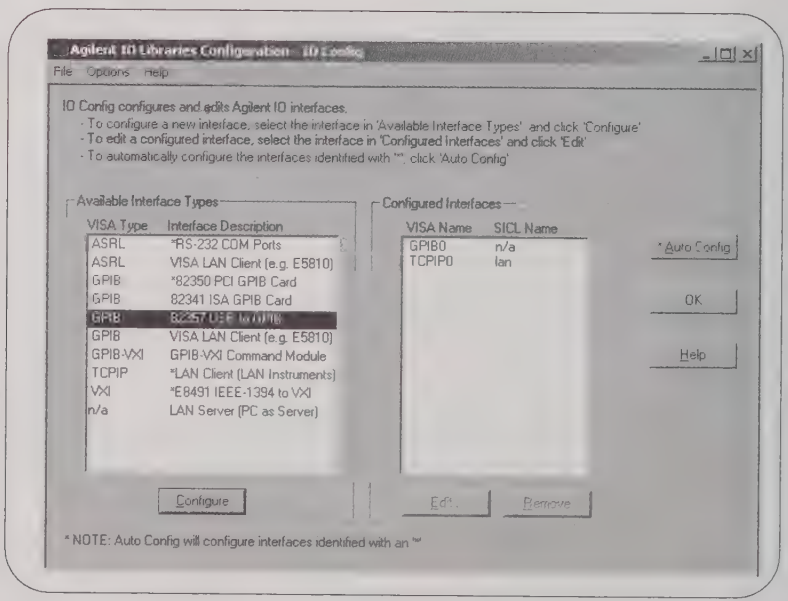
Configuring GPIB (82357 USB) Interfaces

NOTE

An 82357 will be automatically configured when the USB connector is plugged into the PC. You can use the steps in this section to modify an existing configuration.

Using IO Config to Configure GPIB (82357 USB) Interfaces

1 To configure 82357 USB/GPIB interfaces using IO Config, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **GPIB 82357 USB to GPIB** menu item and then click the **Configure** button.


Agilent IO Libraries Configuration - IO Config
File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB *82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a LAN Server (PC as Server)
Configured Interfaces
VISA Name SICL Name
GPIB0 n/a
TCPIP0 lan
* Auto Config
OK
Help
Configure
Edit...
Remove
* NOTE: Auto Config will configure interfaces identified with an '*'

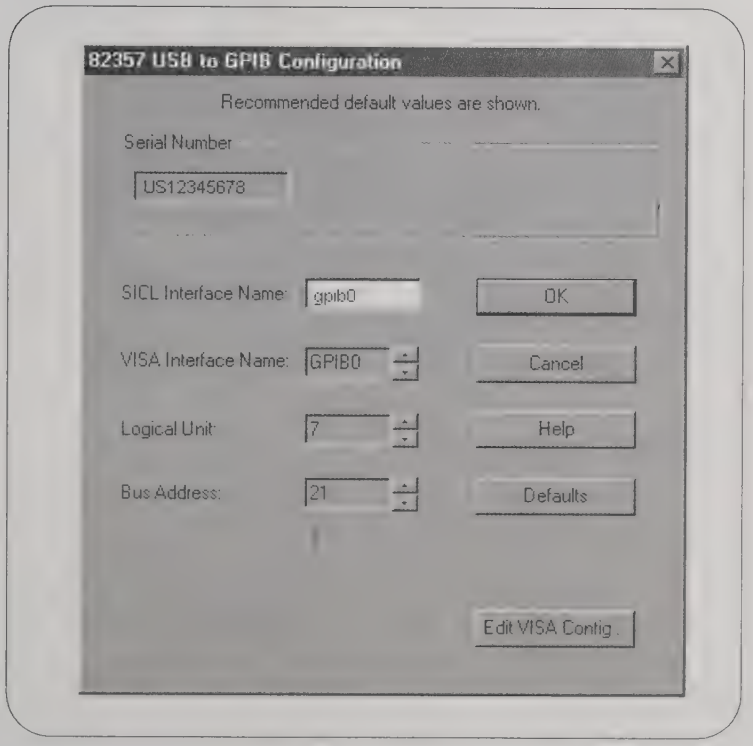
2 If more than one 82357 is installed in your system, the **Select Interface to Configure** screen may appear. If this screen appears, select the **Serial Number** of the interface you want to configure and then click **OK** to display the **82357 USB to GPIB Configuration** screen.

3 When the **82357 USB to GPIB Configuration** screen appears, set the **VISA Interface Name**, the **SICL Interface Name**, the **Logical Unit** and **Bus Address** values as required. Then, click the **OK** button.

4 If you have more than one 82357 in your system, repeat for remaining interfaces.

NOTE

*After the system is configured, this screen may also display an **Edit VISA Config...** button. Clicking this button allows you to manually configure the interface as desired.*

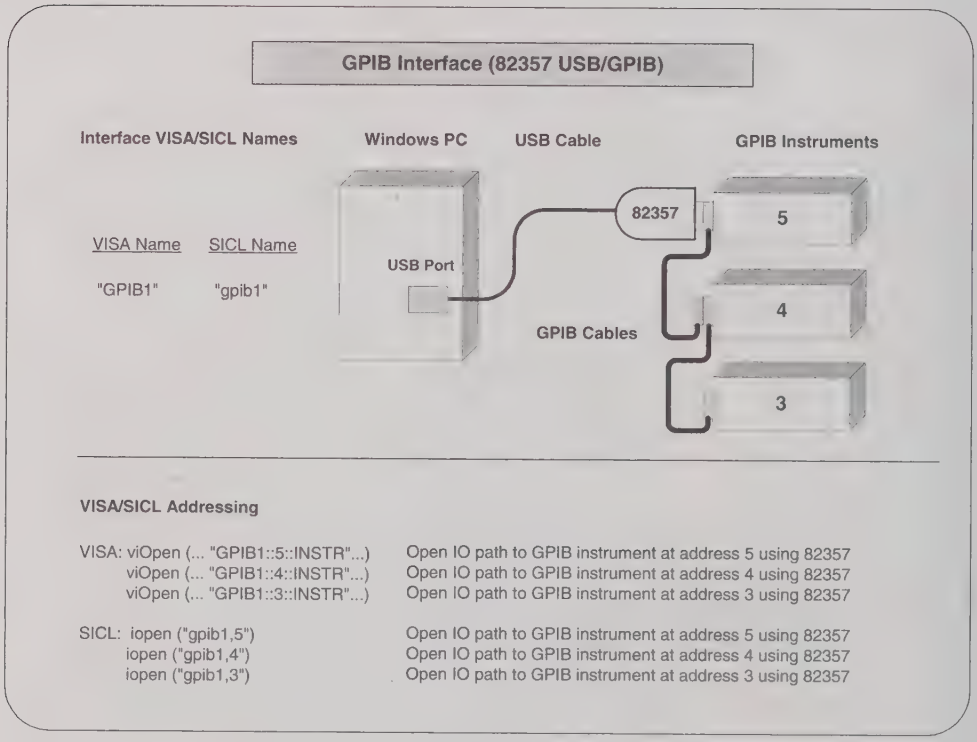


Example: Configuring GPIB (82357 USB/GPIB) Interface

The GPIB interface system in the following figure consists of a Windows PC with an 82357 USB/GPIB Interface connected between a USB port and three GPIB instruments. The instruments are connected via GPIB cables.

For this system, the IO Config utility has been used to assign a VISA name of "GPIB1" and a SICL name of "gpib1". With these names assigned to the interfaces, the VISA/SICL addressing is as shown in the figure.

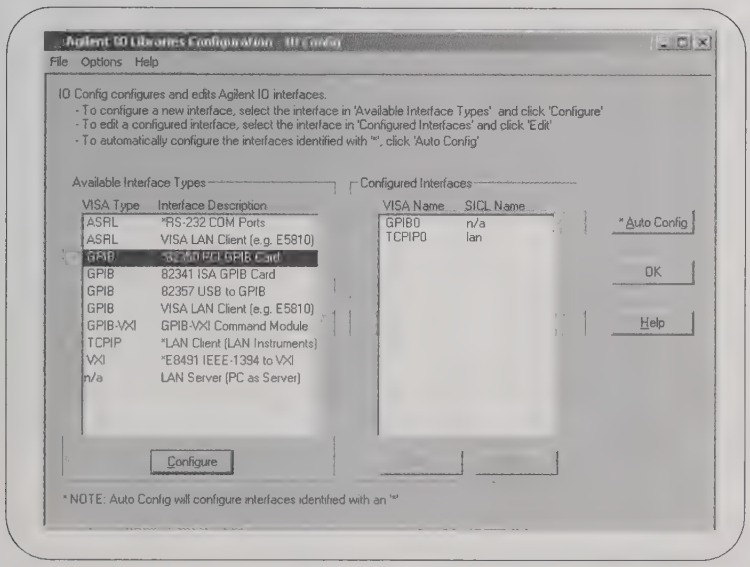
Since unique names have been assigned by IO Config, you can use the VISA **`viOpen`** command to open the I/O paths to the GPIB instruments as shown in the above figure. Or, you can use the SICL **`iopen`** command to open the I/O paths shown.


GPIB Interface (82357 USB/GPIB)
Interface VISA/SICL Names
Windows PC
USB Cable
GPIB Instruments
VISA Name
SICL Name
"GPIB1"
"gpib1"
USB Port
82357
5
4
3
GPIB Cables
VISA/SICL Addressing
VISA: viOpen (... "GPIB1::5::INSTR"...) Open IO path to GPIB instrument at address 5 using 82357
viOpen (... "GPIB1::4::INSTR"...) Open IO path to GPIB instrument at address 4 using 82357
viOpen (... "GPIB1::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82357
SICL: iopen ("gpib1,5") Open IO path to GPIB instrument at address 5 using 82357
iopen ("gpib1,4") Open IO path to GPIB instrument at address 4 using 82357
iopen ("gpib1,3") Open IO path to GPIB instrument at address 3 using 82357

Configuring GPIB (82350 PCI) Interfaces

Using IO Config to Configure GPIB (82350 PCI) Interfaces

1 To configure GPIB (82350 PCI) interfaces using IO Config, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **GPIB 82350 PCI GPIB Card** menu item and then click the **Configure** button.

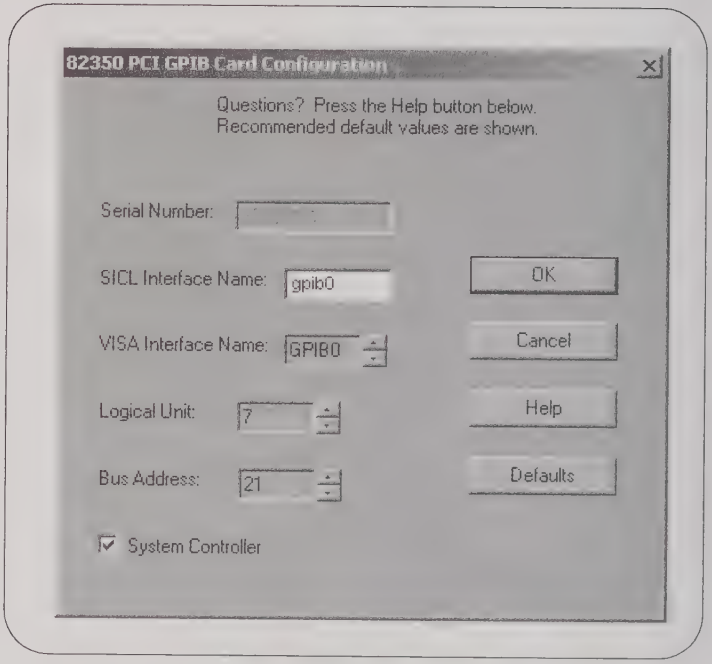

File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB 82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB 82357 USB to GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a LAN Server (PC as Server)
Configure
Configured Interfaces
VISA Name SICL Name
GPIB0 n/a
TCPIP0 lan
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

2 When the **82350 PCI GPIB Card Configuration** screen appears, set the **VISA Interface Name**, **SICL Interface Name**, **Logical Unit** and **Bus Address** values as required. Then, click the **OK** button.

3 If you have more than one 82350 card in your system, repeat for remaining cards.

NOTE

*After the system is configured, this screen may also display an **Edit VISA Config...** button. Clicking this button allows you to manually configure the interface as desired.*

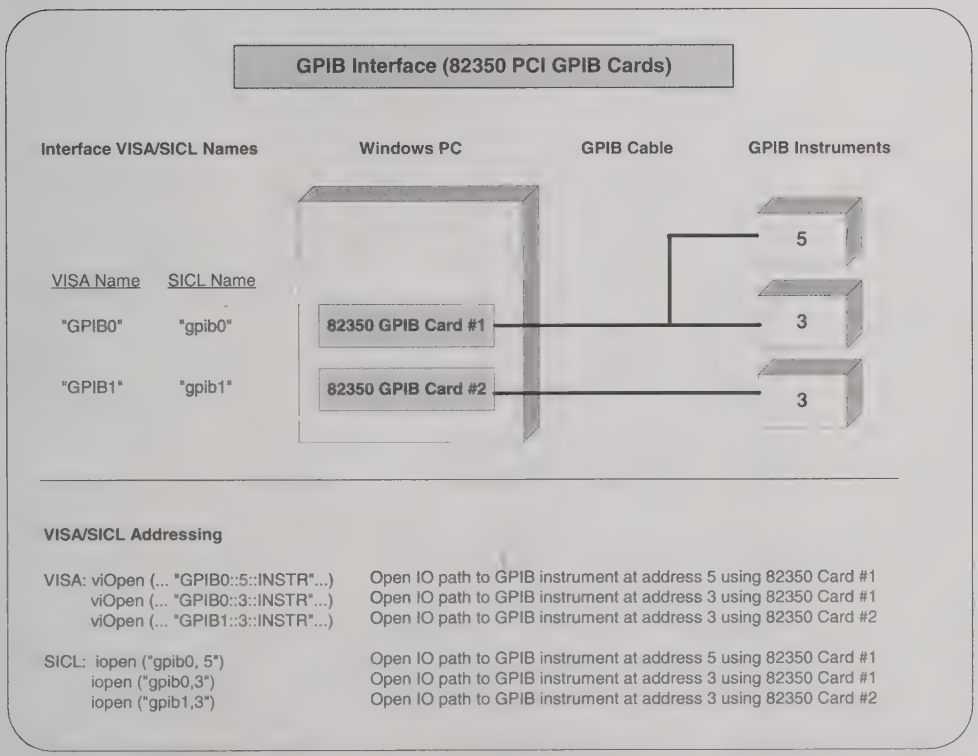

82350 PCI GPIB Card Configuration
Questions? Press the Help button below.
Recommended default values are shown.
Serial Number:
SICL Interface Name:
gpib0
VISA Interface Name:
GPIB0
Logical Unit:
7
Bus Address:
21
System Controller
OK
Cancel
Help
Defaults

Example: Configuring GPIB (82350 PCI) Interfaces

The GPIB interface system in the following figure consists of a Windows PC with two 82350 GPIB cards connected to three GPIB instruments via GPIB cables. For this system, the IO Config utility has been used to assign GPIB card #1 a VISA name of "GPIB0" and a SICL name of "gpib0".

IO Config has also been used to assign GPIB card #2 a VISA name of "GPIB1" and a SICL name of "gpib1". With these names assigned to the interfaces, the VISA/SICL addressing is as shown in the figure.

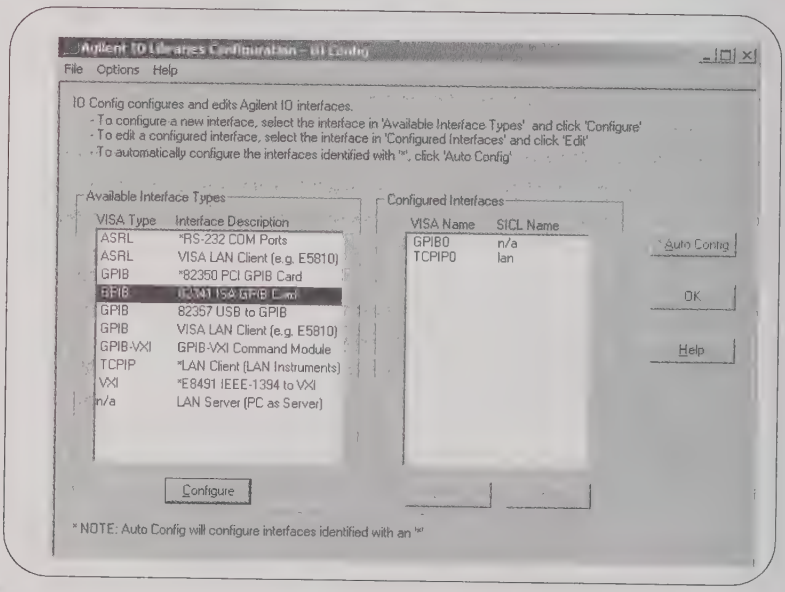
Since unique names have been assigned by IO Config, you can use the VISA **`viOpen`** command to open the I/O paths to the GPIB instruments as shown in the above figure. Or, you can use the SICL **`iopen`** command to open the I/O paths shown.


GPIB Interface (82350 PCI GPIB Cards)
Interface VISA/SICL Names
Windows PC
GPIB Cable
GPIB Instruments
VISA Name
SICL Name
"GPIB0"
"gpib0"
"GPIB1"
"gpib1"
82350 GPIB Card #1
82350 GPIB Card #2
5
3
3
VISA/SICL Addressing
VISA: viOpen (... "GPIB0::5::INSTR"...)
viOpen (... "GPIB0::3::INSTR"...)
viOpen (... "GPIB1::3::INSTR"...)
Open IO path to GPIB instrument at address 5 using 82350 Card #1
Open IO path to GPIB instrument at address 3 using 82350 Card #1
Open IO path to GPIB instrument at address 3 using 82350 Card #2
SICL: iopen ("gpib0, 5")
iopen ("gpib0,3")
iopen ("gpib1,3")
Open IO path to GPIB instrument at address 5 using 82350 Card #1
Open IO path to GPIB instrument at address 3 using 82350 Card #1
Open IO path to GPIB instrument at address 3 using 82350 Card #2

Configuring GPIB (82341 ISA) Interfaces

Using IO Config to Configure GPIB (82341 ISA) Interfaces

1 To configure GPIB (82341 ISA) interfaces using IO Config, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and then click **Run IO Config**. When the main screen appears, highlight the **GPIB 82341 ISA GPIB Card** menu item and then click the **Configure** button.

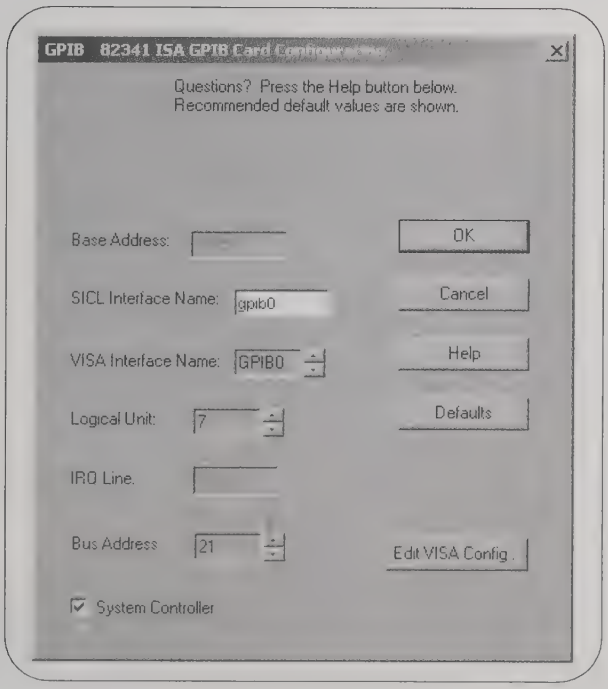


2 When the **82341 ISA GPIB Card Configuration** screen appears, set the VISA **Interface Name**, **SICL Interface Name** and the **Logical Unit**, **IRQ Line**, and **Bus Address** values as required. Then, click the **OK** button.

3 If you have more than one 82341 card in your system, repeat for the remaining cards.

NOTE

After the system is configured, this screen may also display an ***`Edit VISA Config...`*** *button. Clicking this button allows you to manually configure the interface as desired.*

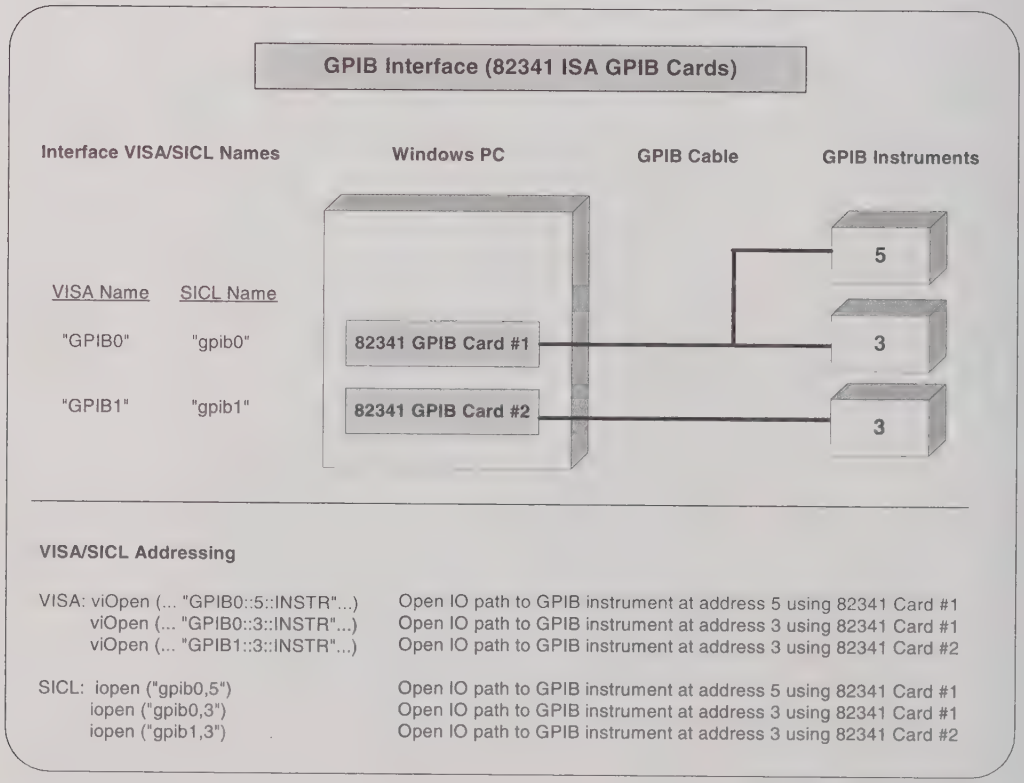


Example: Configuring GPIB ISA (82341) Interfaces

The GPIB interface system in the following figure consists of a Windows PC with two 82341 GPIB cards connected to three GPIB instruments via GPIB cables. For this system, the IO Config utility has been used to assign GPIB card #1 a VISA name of "GPIB0" and a SICL name of "gpib0".

IO Config has also been used to assign GPIB card #2 a VISA name of "GPIB1" and a SICL name of "gpib1". With these names assigned to the interfaces, the VISA/SICL addressing is as shown in the figure.

Since unique names have been assigned by IO Config, you can use the VISA **`viOpen`** command to open the I/O paths to the GPIB instruments as shown in the above figure. Or, you can use the SICL **`iopen`** command to open the I/O paths shown.


GPIB Interface (82341 ISA GPIB Cards)
Interface VISA/SICL Names
Windows PC
GPIB Cable
GPIB Instruments
VISA Name
SICL Name
"GPIB0"
"gpib0"
"GPIB1"
"gpib1"
82341 GPIB Card #1
82341 GPIB Card #2
5
3
3
VISA/SICL Addressing
VISA: viOpen (... "GPIB0::5::INSTR"...) Open IO path to GPIB instrument at address 5 using 82341 Card #1
viOpen (... "GPIB0::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82341 Card #1
viOpen (... "GPIB1::3::INSTR"...) Open IO path to GPIB instrument at address 3 using 82341 Card #2
SICL: iopen ("gpib0,5") Open IO path to GPIB instrument at address 5 using 82341 Card #1
iopen ("gpib0,3") Open IO path to GPIB instrument at address 3 using 82341 Card #1
iopen ("gpib1,3") Open IO path to GPIB instrument at address 3 using 82341 Card #2

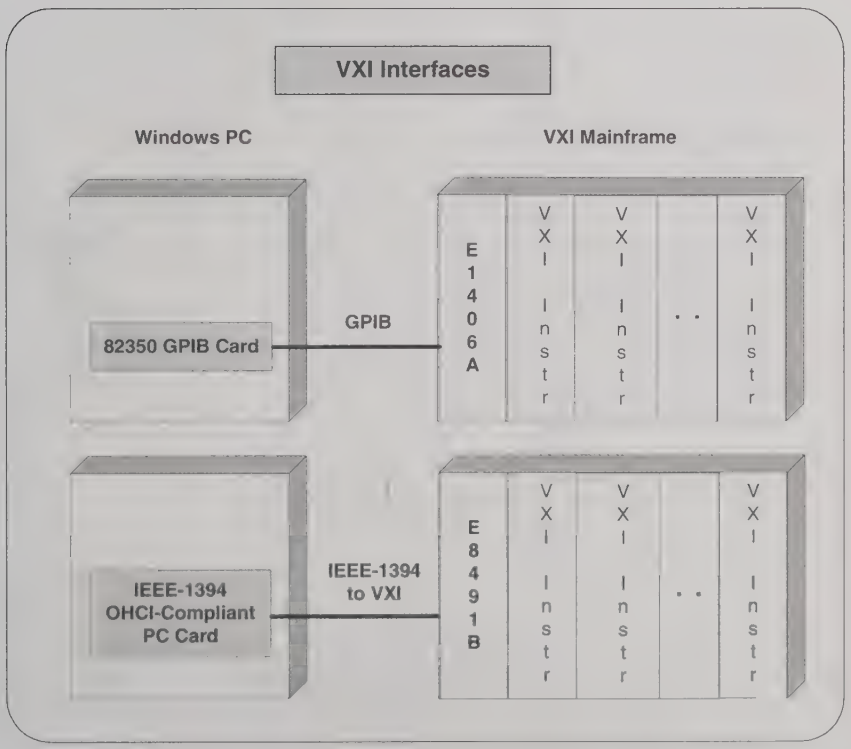
Configuring VXI Interfaces

This section gives guidelines to use the IO Config utility to configure VXI interfaces, including:

- VXI Interfaces Overview
- Configuring GPIB-VXI (E1406A) Interfaces
- Configuring VXI (E8491B) Interfaces

VXI Interfaces Overview

As shown in the following figure, a typical VXI interface consists of one of two main hardware configurations: E1406A Command Module or E8491B IEEE-1394 to VXI Module.

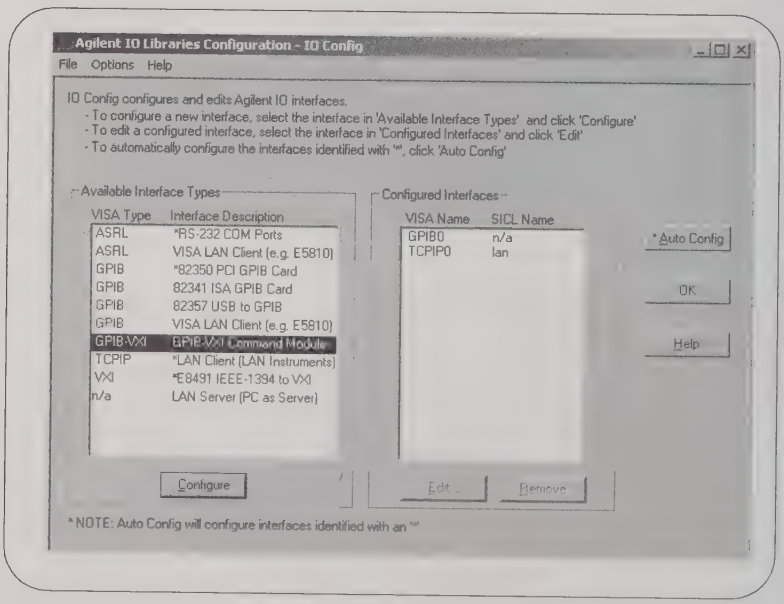


- The **E1406A Command Module** version consists of a Windows PC with an 82350 (or equivalent) GPIB card and a VXI mainframe with an E1406A Command Module and one or more VXI instruments. I/O communication from the PC to the VXI instruments is via the GPIB card, GPIB cable, and E1406A Command Module.
- The **E8491B Module** version consists of a Windows PC with an IEEE-1394 OHCI-Compliant (FireWire) PC card and a VXI mainframe with an E8491B IEEE-1394 to VXI Module and one or more VXI instruments. I/O communication from the PC to the VXI instruments is via the PC card, IEEE-1394 to VXI cable, and E8491B Module.

Configuring GPIB-VXI (E1406A) Interfaces

Using IO Config to Configure GPIB-VXI (E1406A) Interfaces

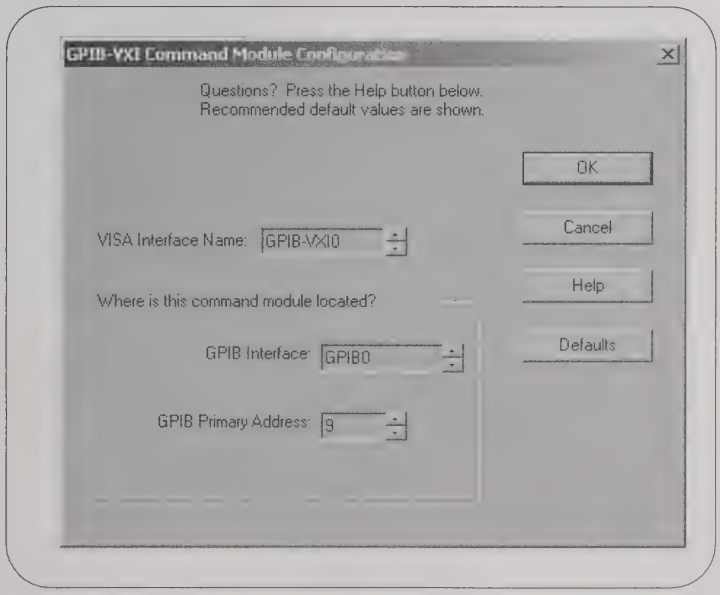
1 To configure GPIB-VXI (E1406A Command Module) interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **GPIB-VXI Command Module** menu item and then click the **Configure** button.



2 When the **GPIB-VXI Command Module Configuration** screen appears, set the **VISA Interface Name**, **GPIB Interface Name**, and **GPIB Primary Address** as required. Then, click the **OK** button.

NOTE

*After the system is configured, this screen may also display an **Edit VISA Config...** button. Clicking this button allows you to manually configure the interface as desired.*



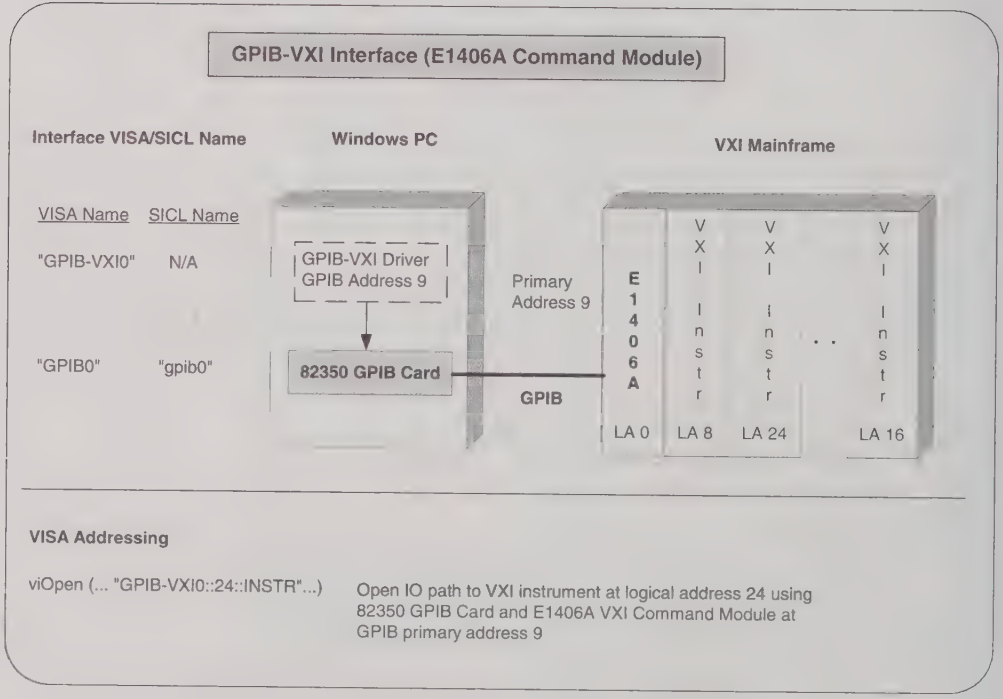
Example: Configuring GPIB-VXI (E1406A) Interfaces

The GPIB-VXI interface system in the following figure consists of a Windows PC with an 82350 GPIB card that connects to an E1406A Command Module in a VXI Mainframe. The VXI mainframe includes one or more VXI instruments.

When the IO Libraries were installed, a GPIB-VXI driver with GPIB address 9 was also installed and the E1406A was configured for primary address 9 and logical address (LA) 0. The three VXI instruments shown have logical addresses 8, 16, and 24.

The IO Config utility has been used to assign the GPIB-VXI driver a VISA Name of "GPIB-VXI0" and to assign the 82350 GPIB card a VISA name of "GPIB0" and SICL name of "gpib0". With these names assigned to the interfaces, the VISA addressing is as shown in the figure.

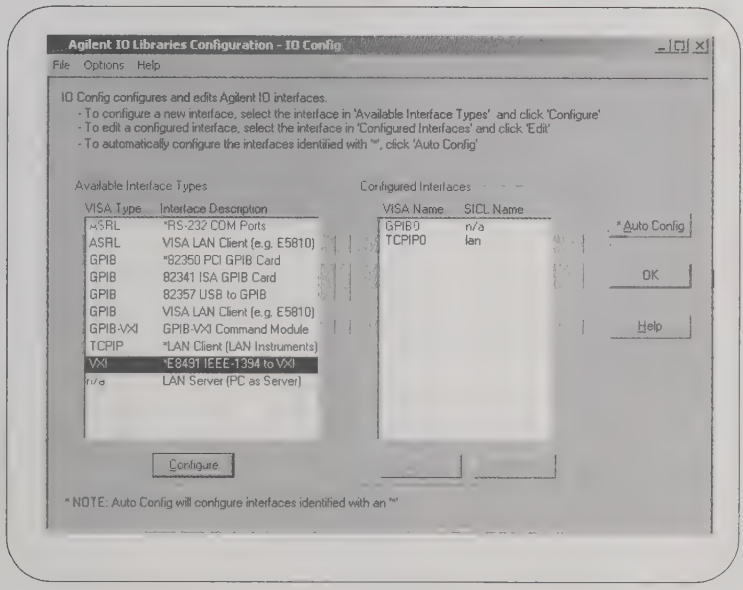
For information on the E1406A Command Module, see the *Agilent E1406A Command Module User's Guide*. For information on VXI instruments, see the applicable *VXI instrument User's Guide*.



Configuring VXI (E8491B) Interfaces

Using IO Config to Configure VXI (E8491B) Interfaces

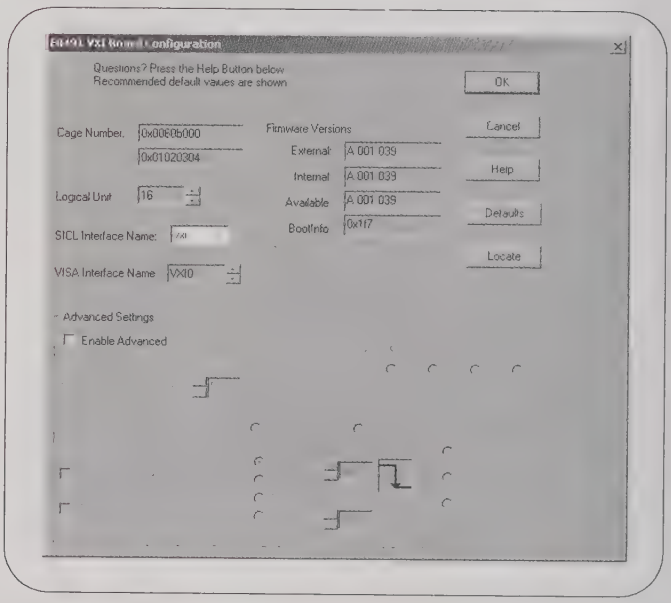
1 To configure VXI (E8491B module) interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config.** When the main screen appears, highlight the **VXI E8491 IEEE-1394 to VXI** menu item and click the **Configure** button.


Agilent IO Libraries Configuration - IO Config
File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type
Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB *82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB 82357 USB to GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a LAN Server (PC as Server)
Configure
Configured Interfaces
VISA Name
SICL Name
GPIB0 n/a
TCPIP0 lan
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

2 When the **E8491 VXI Board Configuration** screen appears, set the VISA Interface Name, as required. Then, click the **OK** button. .

NOTE

After the system is configured, this screen may also display an ***`Edit VISA Config...`*** *button. Clicking this button allows you to manually configure the interface as desired.*

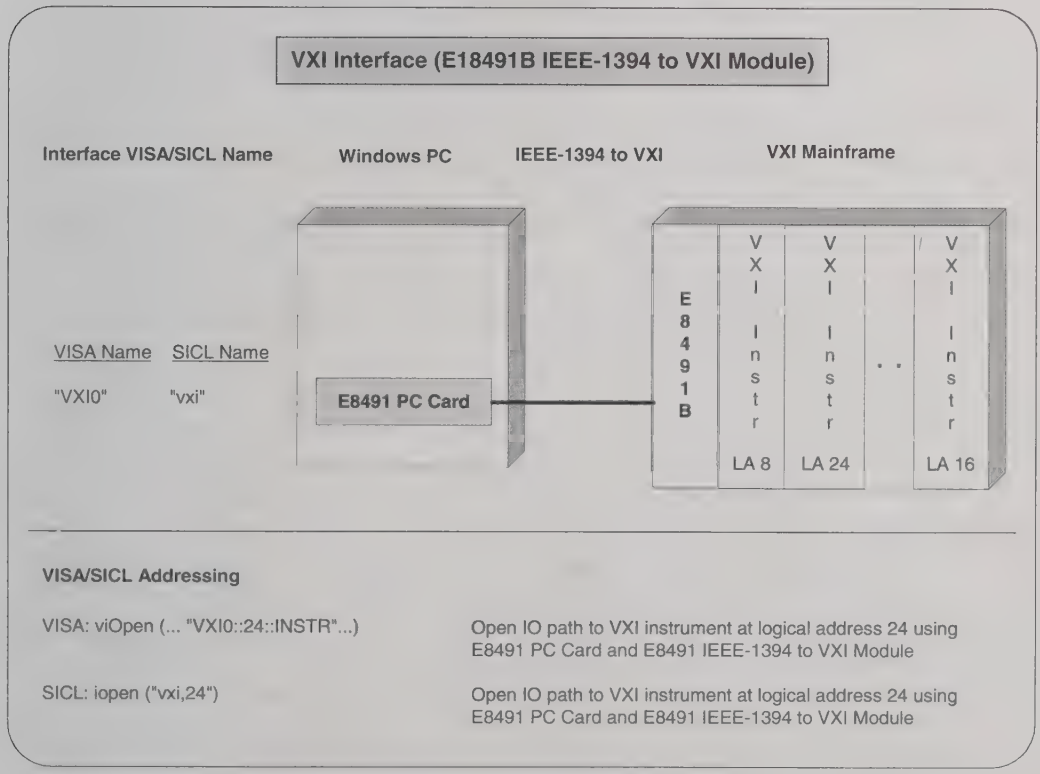


Example: Configuring VXI (E8491B) Interfaces

The VXI interface system in the following figure consists of a Windows PC with an E8491 PC card that connects to an E8491B IEEE-1394 to VXI Module in a VXI Mainframe. The VXI mainframe includes one or more VXI instruments. For this system, the three VXI instruments shown have logical addresses 8, 16, and 24.

The IO Config utility has been used to assign the E8491 PC card a VISA name of "VXI0" and SICL name of "vxi". With these names assigned to the interface, you can use the VISA/SICL addressing shown in the figure.

For information on the E8491B module, see the *Agilent E8491B User's Guide*. For information on VXI instruments, see the applicable *VXI Instrument User's Guide*.


VXI Interface (E18491B IEEE-1394 to VXI Module)
Interface VISA/SICL Name
Windows PC
IEEE-1394 to VXI
VXI Mainframe
VISA Name
SICL Name
"VXI0"
"vxi"
E8491 PC Card
E8491B
VXI Instr
LA 8
LA 24
LA 16
VISA/SICL Addressing
VISA: viOpen (... "VXI0::24::INSTR"...)
Open IO path to VXI instrument at logical address 24 using E8491 PC Card and E8491 IEEE-1394 to VXI Module
SICL: iopen ("vxi,24")
Open IO path to VXI instrument at logical address 24 using E8491 PC Card and E8491 IEEE-1394 to VXI Module

Configuring LAN Interfaces

This section gives guidelines to use the IO Config utility to configure LAN interfaces, including:

- LAN Interfaces Overview
- Configuring TCPIP LAN Client Interfaces
- Configuring GPIB VISA LAN Client Interfaces
- Configuring ASRL VISA LAN Client Interfaces
- Configuring LAN Server Interfaces

LAN Interfaces Overview

This section gives guidelines to use the Agilent IO Libraries to configure instruments over a Local Area Network (LAN). A LAN is a way to extend the control of instrumentation beyond the limits of typical instrument interfaces. To communicate over the LAN, you must first configure the TCPIP LAN Client interface.

NOTE

*When **GPIB VISA LAN Client (e.g. E5810)** or **ASRL VISA LAN Client (e.g. E5810)** is configured, **TCPIP LAN Client (LAN Instruments)** is also automatically configured.*

LAN Client/Server Model

The LAN software provided with the Agilent IO Libraries allows instrumentation control over a LAN. Using standard LAN connections, instruments can be controlled from computers that do not have special interfaces for instrument control.

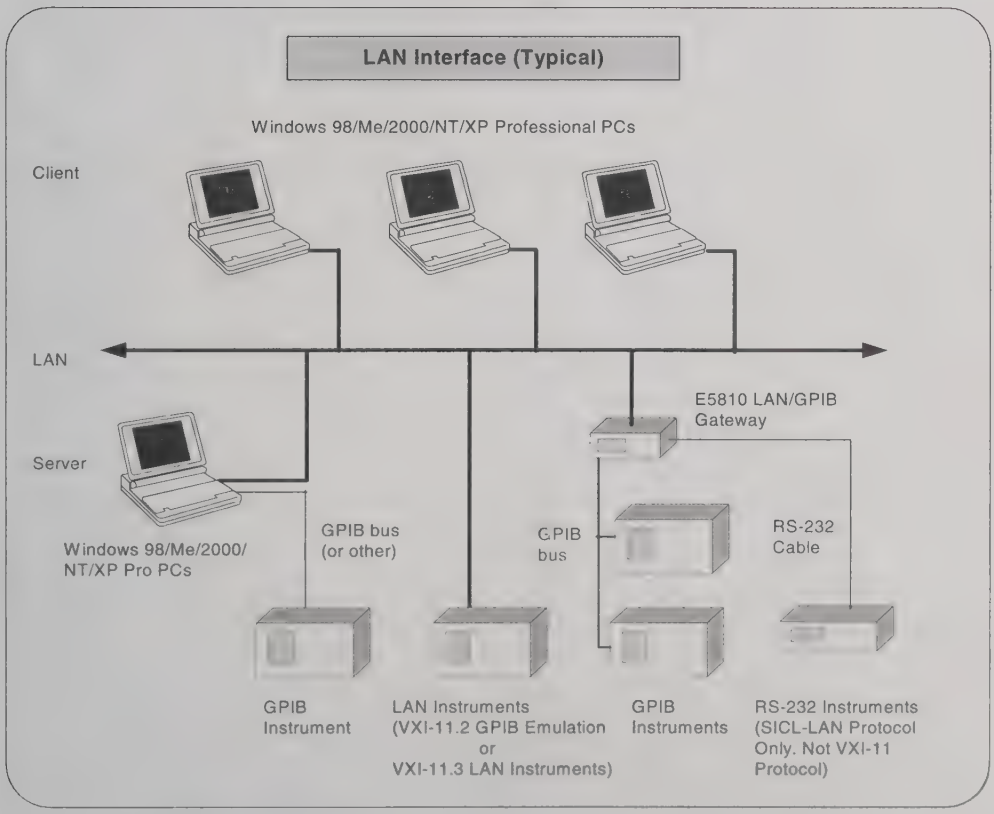
The LAN software uses the **client/server model** of computing. **Client/server computing** refers to a model where an application (the **client**) does not perform all necessary tasks of the application itself. Instead, the client makes requests of another computing device (the **server**) for certain services.

LAN Hardware Architecture

As shown in the following figure, a LAN client (such as a Windows 98/Me/NT/2000/XP Professional PC) makes VISA requests over the network to a LAN server (such as a Windows 98/Me/NT/2000/XP Professional PC or an E5810 LAN/GPIB Gateway for Windows).

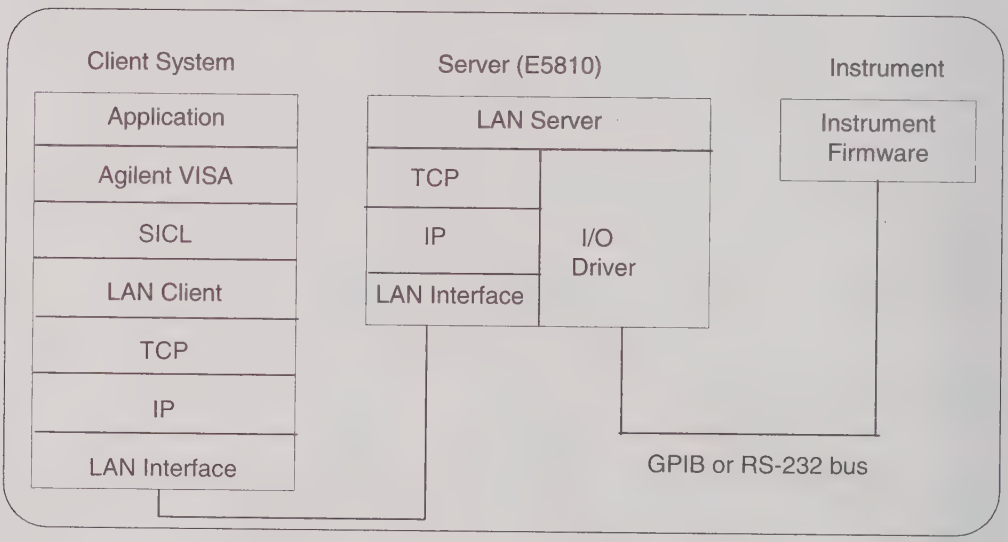
The LAN server is connected to the instrumentation or devices to be controlled. Once the LAN server has completed the requested operation on the instrument or device, the LAN server sends a reply to the LAN client. This reply contains requested data and status information that indicates whether or not the operation was successful.

The LAN server acts as a **gateway** between the LAN software that the client system supports and the instrument-specific interface that the device supports.



LAN Software Architecture

As shown in the following figure, the client system contains the LAN client software and the LAN software (TCP/IP) needed to access the server (gateway). The gateway contains the LAN server software, LAN (TCP/IP) software, and the instrument driver software needed to communicate with the client and to control the instruments or devices connected to the gateway.



The LAN software is built on top of standard LAN networking protocols. There are two LAN networking protocols provided with the Agilent IO Libraries software. You can use one or both of these protocols when configuring your systems (via Agilent IO Libraries configuration) to use VISA and SICL over LAN.

- **SICL-LAN Protocol** is a networking protocol developed by Agilent that is compatible with all VISA LAN products. This LAN networking protocol is the default choice in the Agilent IO Libraries configuration when configuring the LAN client. The SICL LAN protocol on HP-UX 10.20 and on Windows 98/Me/2000/NT/XP Professional supports VISA operations over LAN to GPIB interfaces.
- **VXI-11 (TCP/IP Instrument Protocol)** is a networking protocol developed by the VXIbus Consortium based on the SICL LAN Protocol that permits interoperability of LAN software from different vendors who meet the VXIbus Consortium standards.

When using either of these networking protocols, the LAN software uses the TCP/IP protocol suite to pass messages between the LAN client and the LAN server. The server accepts device I/O requests over the network from the client and then proceeds to execute those I/O requests on a local interface (GPIB, etc.).

By default, the LAN Client supports both protocols by automatically detecting the protocol the server is using. When a VISA **viOpen** or SICL **iopen** call is performed, the LAN Client driver first tries to connect using the SICL-LAN protocol. If that fails, the driver will try to connect using the VXI-11 protocol.

If you want to control the protocol used, you can configure more than one LAN Client interface and set each interface to a different protocol. The protocol used will then depend on the interface you are connecting through.

In VISA, the protocol used is determined by the configuration settings and cannot be changed programatically. In SICL, the programmer can override the configuration settings by specifying the protocol in the **iopen** string. Some examples follow. Note that SICL names are case-sensitive.

- **iopen("lan[machineName]:gpib0,1")** will use the configured default protocol. If AUTO is configured, SICL-LAN protocol will be attempted. If that is not supported, VXI-11 protocol will be used.
- **iopen("lan;auto[machineName]:gpib0,1")** will automatically select the protocol (SICL-LAN if available and VXI-11 otherwise.)
- **iopen("lan;sicl-lan[machineName]:gpib0,1")** will use SICL-LAN protocol.
- **iopen("lan;vxi-11[machineName]:gpib0,1")** will use VXI-11 protocol.

The LAN Client also supports TCP/IP socket reads and writes. To open a socket session, use **iopen("lan,socketNbr[machineName]")**. For example, **iopen("lan,7777[machineName]")** will open a socket connection for socket number 7777 on 'machineName'.

When you have configured VISA LAN Client interfaces, you can then use the interface name specified during configuration in a VISA **viOpen** call of your program.

Configuring TCPIP LAN Client Interfaces

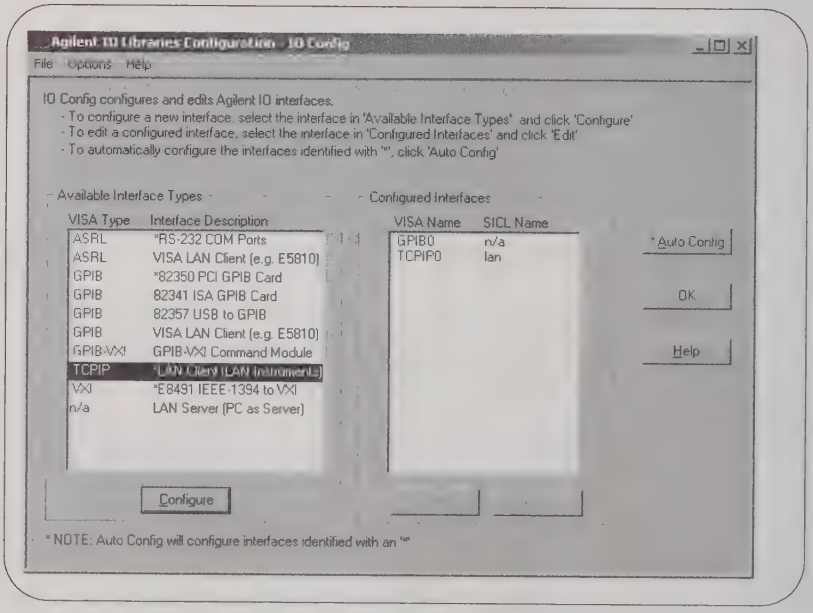
NOTE

*When **GPIB VISA LAN Client (e.g. E5810)** or **ASRL VISA LAN Client (e.g. E5810)** is configured, **TCPIP LAN Client (LAN Instruments)** is also automatically configured.*

*A single **TCPIP Lan Client** interface can be used by any number of **VISA LAN Client** interfaces. The main reason for having more than one LAN Client configured is if you want to use different protocols (such as SICL-LAN or VXI-11) in different **VISA LAN Clients**.*

Using IO Config to Configure TCPIP LAN Client Interfaces

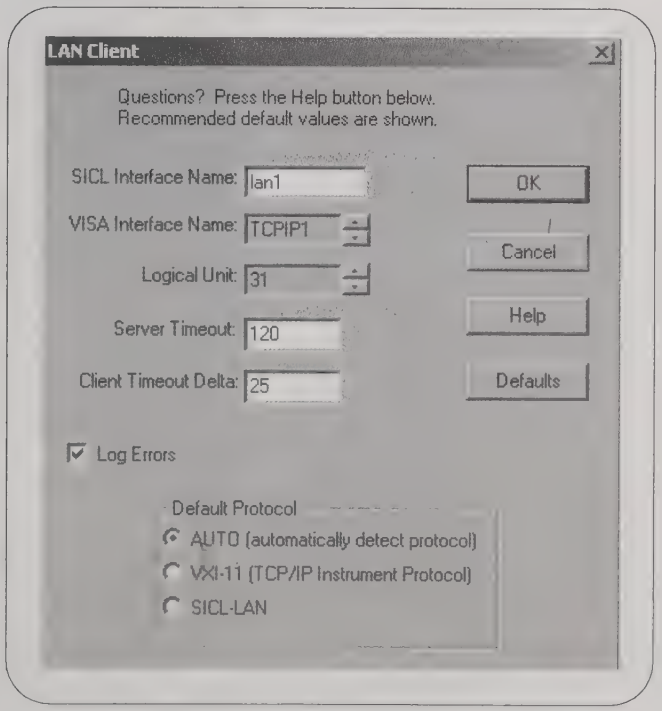
1 To configure TCPIP LAN Client interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **TCPIP LAN Client (LAN Instruments)** menu item and then click the **Configure** button.



2 When the **LAN Client** screen appears, set the **SICL Interface Name**, **VISA Interface Name, Logical Unit number**, **Server Timeout value**, and **Client Timeout Delta** as required. Also, you can select the **Default Protocol** (**AUTO**, **VXI-11**, or **SICL-LAN**) and choose whether or not to **Log Errors**. Then, click the **OK** button.

NOTE

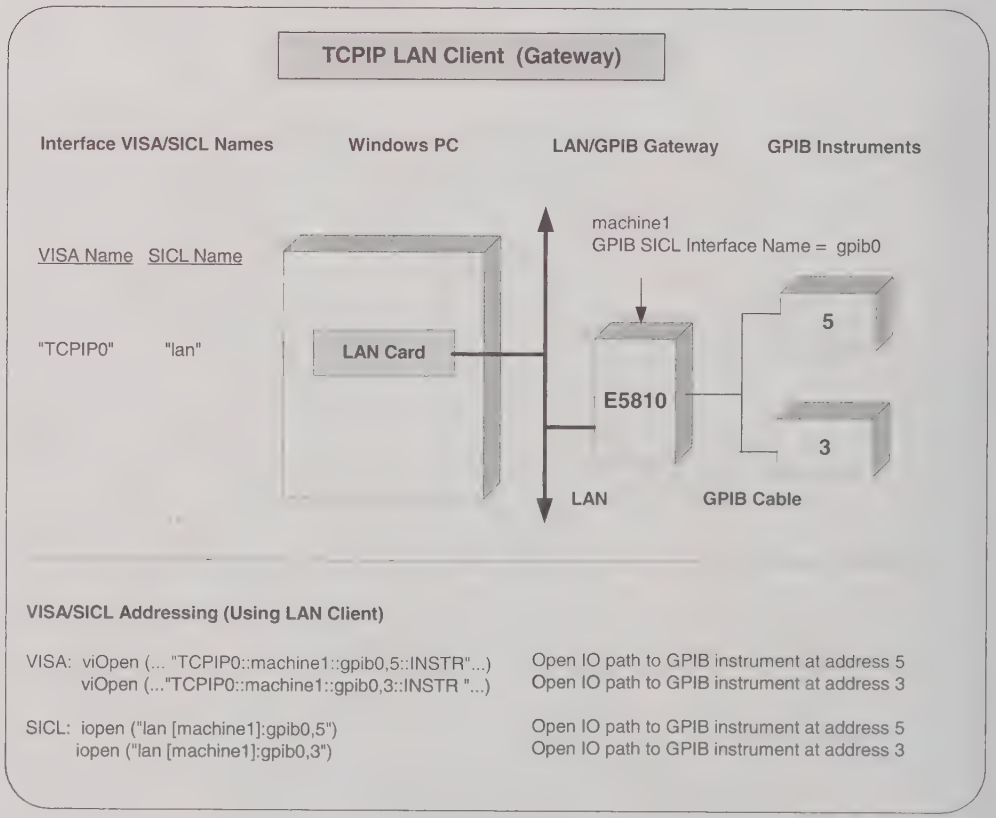
After the system is configured, this screen may also display an ***`Edit VISA Config...`*** *button. Clicking this button allows you to manually configure the interface as desired.*



Example: Configuring TCPIP LAN Client (E5810 Gateway) Interface

The TCPIP LAN Client interface system in the following figure consists of a Windows PC with a LAN card, an E5810 LAN/GPIB gateway, and two GPIB instruments. For this system, the IO Config utility has been used to assign the LAN card a VISA name of "TCPIP0" and SICL name of "lan".

With these names assigned to the interface, VISA/SICL addressing is as shown in the figure. Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command or the SICL **`iopen`** command to open the I/O paths to the GPIB instruments as shown in the figure.

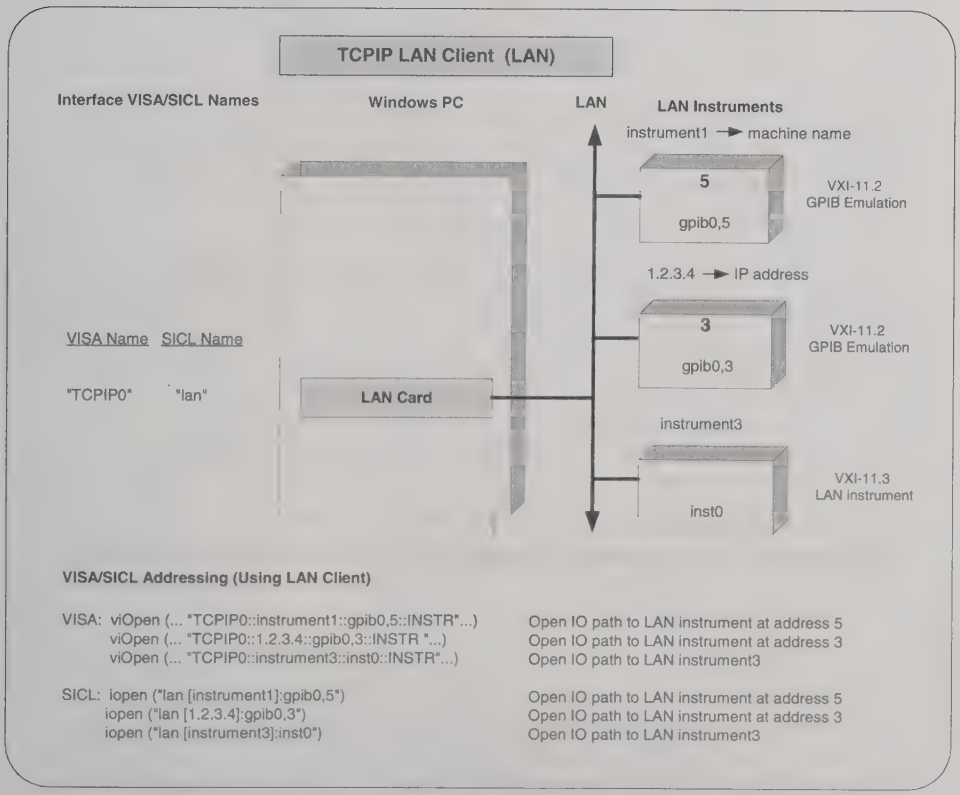


Example: Configuring TCPIP LAN Client (LAN Instruments) Interfaces

The TCPIP LAN Client interface system in the following figure consists of a Windows PC with a LAN card and three LAN instruments. Instrument1 and instrument2 are VXI-11.2 (GPIB Emulation) instruments and instrument3 is a VXI-11.3 LAN instrument.

For this system, the IO Config utility has been used to assign the LAN card a VISA name of "TCPIP0" and SICL name of "lan". For the addressing examples, instrument1 has been addressed by its machine name, instrument 2 has been addressed by its IP address, and instrument3 by its LAN name (inst0).

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command or the SICL **`iopen`** command to open the I/O paths to the GPIB instruments as shown in the figure.


TCPIP LAN Client (LAN)
Interface VISA/SICL Names
Windows PC
LAN
LAN Instruments
instrument1 → machine name
5
gpib0,5
VXI-11.2
GPIB Emulation
1.2.3.4 → IP address
3
gpib0,3
VXI-11.2
GPIB Emulation
VISA Name SICL Name
"TCPIP0" "lan"
LAN Card
instrument3
inst0
VXI-11.3
LAN instrument
VISA/SICL Addressing (Using LAN Client)
VISA: viOpen (... "TCPIP0::instrument1::gpib0,5::INSTR"...) Open IO path to LAN instrument at address 5
viOpen (... "TCPIP0::1.2.3.4::gpib0,3::INSTR "...) Open IO path to LAN instrument at address 3
viOpen (... "TCPIP0::instrument3::inst0::INSTR"...) Open IO path to LAN instrument3
SICL: iopen ("lan [instrument1]:gpib0,5") Open IO path to LAN instrument at address 5
iopen ("lan [1.2.3.4]:gpib0,3") Open IO path to LAN instrument at address 3
iopen ("lan [instrument3]:inst0") Open IO path to LAN instrument3

Configuring GPIB VISA LAN Client Interfaces

NOTE

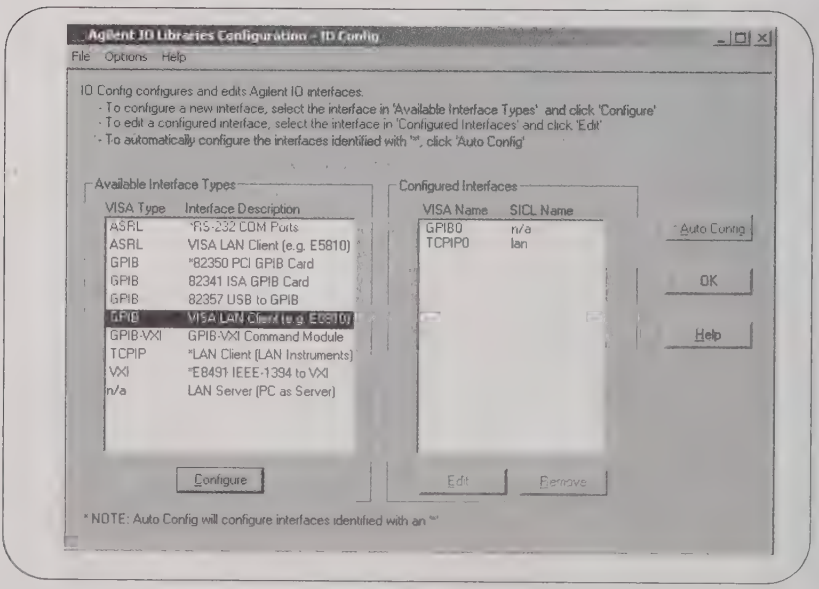
*When **GPIB VISA LAN Client** or **ASRL VISA LAN Client** is configured, the **TCPIP LAN Client** interface is also automatically configured. See "Configuring TCPIP LAN Client Interfaces" for details on configuring **TCPIP LAN Client** interfaces.*

Using IO Config to Configure GPIB VISA LAN Client Interfaces

1. To configure GPIB VISA LAN Client interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **GPIB VISA LAN Client (e.g. 5810)** menu item and then click the **Configure** button.

NOTE

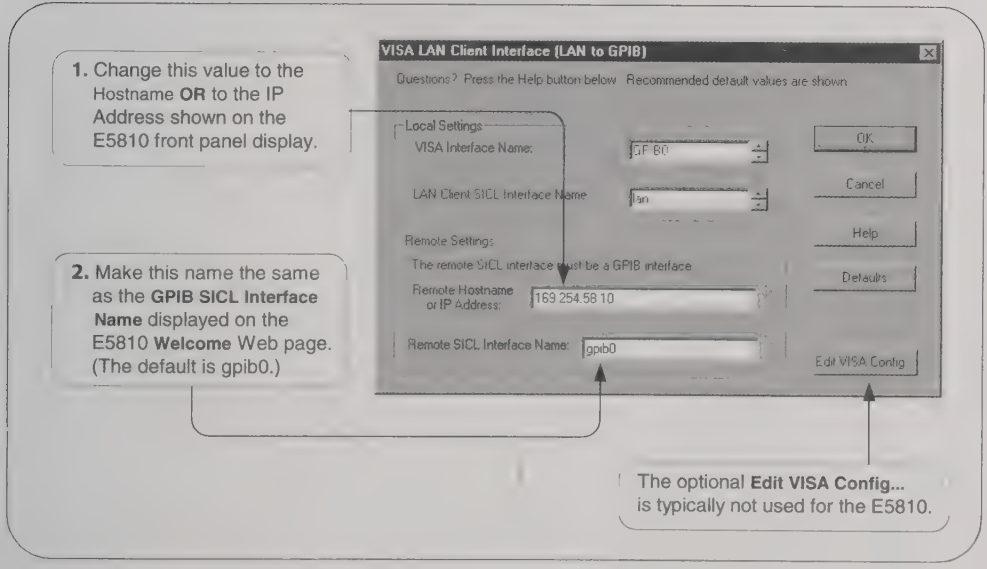
*To configure an ASRL (RS-232) instrument for **VISA LAN Client**, see "Configuring ASRL VISA LAN Client Interfaces" in this chapter.*



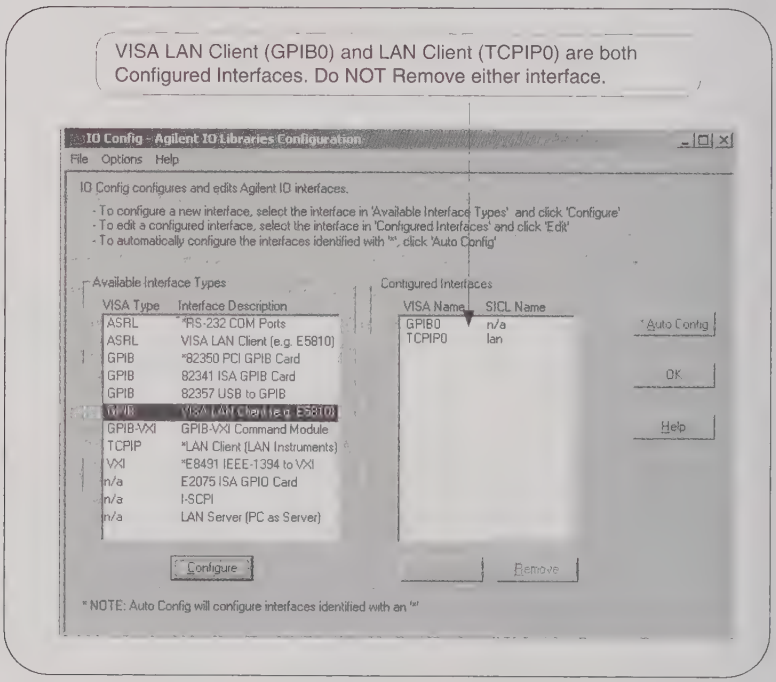
NOTE

GPIB VISA LAN Client (e.g. E5810) *is not marked with an asterisk (*) (interface is not Autoconfigurable) because you cannot use the* ****Auto Config*** *button to automatically configure the interface. Instead, you must manually configure the interface, as shown.*

2 From the **VISA LAN Client Interface (LAN to GPIB)** screen appears, as required, set the **Remote Hostname** or **IP Address** and **Remote SICL Interface Name** as shown in the following figure. Then, click the **OK** button. See *Chapter 3 - Using E5810 Web Access* in the *E5810 LAN/GPIB Gateway for Windows User's Guide* for information on using the E5810 **Welcome** page.


1. Change this value to the Hostname OR to the IP Address shown on the E5810 front panel display.
2. Make this name the same as the GPIB SICL Interface Name displayed on the E5810 Welcome Web page. (The default is gpib0.)
VISA LAN Client Interface (LAN to GPIB)
Questions? Press the Help button below. Recommended default values are shown.
Local Settings
VISA Interface Name:
GPIB0
LAN Client SICL Interface Name
lan
Remote Settings
The remote SICL interface must be a GPIB interface
Remote Hostname or IP Address:
169.254.58.10
Remote SICL Interface Name:
gpib0
OK
Cancel
Help
Defaults
Edit VISA Config
The optional Edit VISA Config... is typically not used for the E5810.

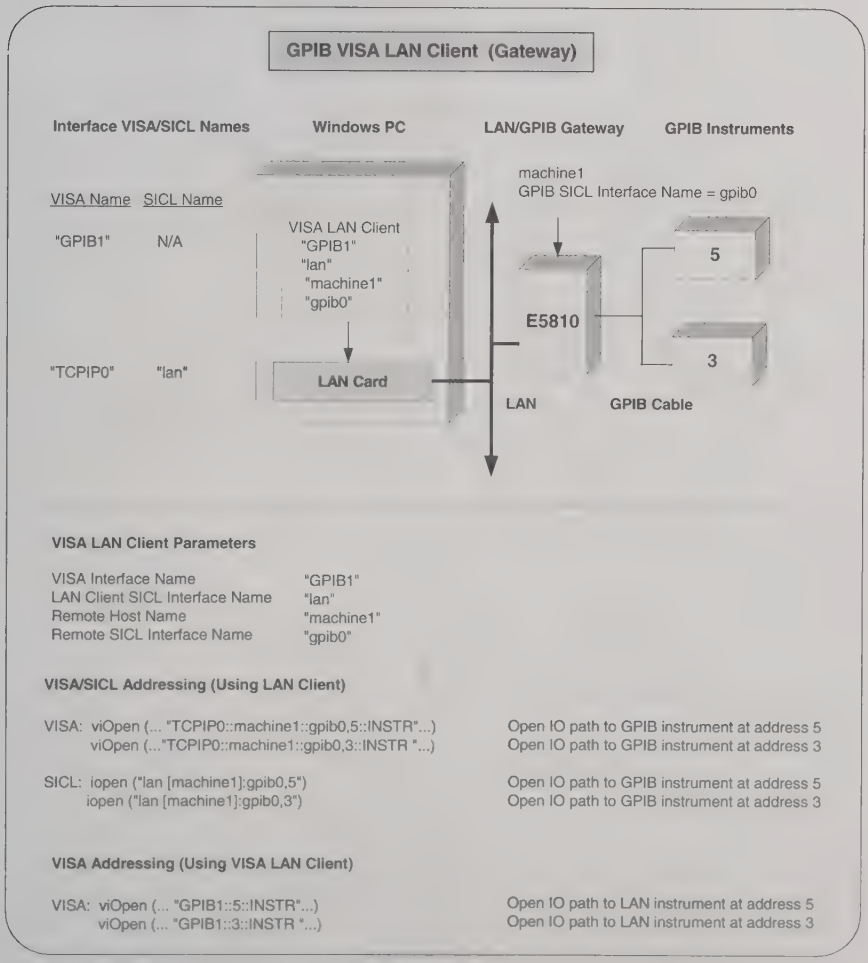
3 **Do Not Delete the LAN Client Interface.** When the VISA LAN Client is configured, the LAN Client is also automatically configured in the background. Thus, when VISA LAN Client configuration completes, two configured interfaces are displayed on the IO Config main screen. See the following figure for a typical display. Do NOT remove the LAN Client or the VISA LAN Client interface, as the application will not run if either interface is removed.


VISA LAN Client (GPIB0) and LAN Client (TCPIP0) are both Configured Interfaces. Do NOT Remove either interface.
IO Config - Agilent IO Libraries Configuration
File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB *82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB 82357 USB to GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a E2075 ISA GPIO Card
n/a I-SCPI
n/a LAN Server (PC as Server)
Configure
Configured Interfaces
VISA Name SICL Name
GPIB0 n/a
TCPIP0 lan
Remove
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

Example: Configuring GPIB VISA LAN Client (E5810 Gateway) Interfaces

The GPIB VISA LAN Client interface system in the following figure consists of a Windows PC with a LAN card, an E5810 LAN/GPIB Gateway, and two GPIB instruments. The IO Config utility has been used to assign the values shown in the figure.

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command or the SICL **`iopen`** command to open the I/O paths to the GPIB instruments as shown in the figure. However, SICL addressing is **not** supported when using GPIB VISA LAN Client.


GPIB VISA LAN Client (Gateway)
Interface VISA/SICL Names
Windows PC
LAN/GPIB Gateway
GPIB Instruments
VISA Name
SICL Name
"GPIB1"
N/A
"TCPIP0"
"lan"
VISA LAN Client
"GPIB1"
"lan"
"machine1"
"gpib0"
LAN Card
machine1
GPIB SICL Interface Name = gpib0
E5810
5
3
LAN
GPIB Cable
VISA LAN Client Parameters
VISA Interface Name "GPIB1"
LAN Client SICL Interface Name "lan"
Remote Host Name "machine1"
Remote SICL Interface Name "gpib0"
VISA/SICL Addressing (Using LAN Client)
VISA: viOpen (... "TCPIP0::machine1::gpib0,5::INSTR"...) Open IO path to GPIB instrument at address 5
viOpen (..."TCPIP0::machine1::gpib0,3::INSTR "...) Open IO path to GPIB instrument at address 3
SICL: iopen ("lan [machine1]:gpib0,5") Open IO path to GPIB instrument at address 5
iopen ("lan [machine1]:gpib0,3") Open IO path to GPIB instrument at address 3
VISA Addressing (Using VISA LAN Client)
VISA: viOpen (... "GPIB1::5::INSTR"...) Open IO path to LAN instrument at address 5
viOpen (... "GPIB1::3::INSTR "...) Open IO path to LAN instrument at address 3

Example: Configuring GPIB VISA LAN Client (LAN Instruments) Interfaces

The GPIB VISA LAN Client interface system in the following figure consists of a Windows PC with a LAN card and three LAN instruments. Instrument1 and instrument2 are VXI-11.2 (GPIB Emulation) instruments and instrument3 is a VXI-11.3 LAN instrument.

For this system, the IO Config utility has been used to assign the LAN card a VISA name of "TCPIP0" and SICL name of "lan". In addition, two VISA LAN Clients have been configured with the interface names and host names shown in the figure.

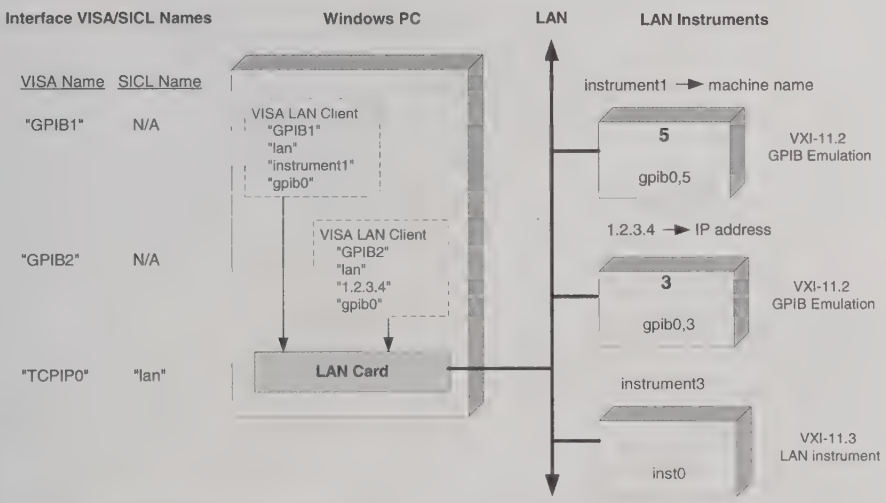
For the addressing examples, instrument1 has been addressed by its machine name, instrument 2 has been addressed by its IP address, and instrument3 by its LAN name (inst0).

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command or the SICL **`iopen`** command to open the I/O paths to the GPIB instruments as shown in the figure. Note, however, that you cannot talk to instrument3 with GPIB VISA LAN Client. You must use LAN Client (with VISA or SICL) to talk to instrument3, since instrument3 is not a remote gpib interface.

NOTE

When using the VXI-11 protocol with GPIB VISA LAN Client, the Remote SICL Interface Name must be of the form ***`gpibN`*** *where* ***`N`*** *is 0 or a positive integer. This restriction does not apply to the SICL-LAN protocol.*

GPIB VISA LAN Client (LAN)



VISA LAN Client Parameters	GPIB1	GPIB2
VISA Interface Name	"GPIB1"	"GPIB2"
LAN Client SICL Interface Name	"lan"	"lan"
Remote Host Name	"instrument1"	"1.2.3.4"
Remote SICL Interface Name	"gpib0"	"gpib0"

VISA/SICL Addressing (Using LAN Client)

VISA: viOpen (... "TCPIP0::instrument1::gpib0,5::INSTR"...)	Open IO path to LAN instrument at address 5
viOpen (... "TCPIP0::1.2.3.4::gpib0,3::INSTR "...)	Open IO path to LAN instrument at address 3
viOpen (... "TCPIP0::instrument3::inst0::INSTR"...)	Open IO path to LAN instrument3
SICL: iopen ("lan [instrument1]:gpib0,5")	Open IO path to LAN instrument at address 5
iopen ("lan [1.2.3.4]:gpib0,3")	Open IO path to LAN instrument at address 3
iopen ("lan [instrument3]:inst0")	Open IO path to LAN instrument3

VISA Addressing (Using VISA LAN Client)

VISA: viOpen (... "GPIB1::5::INSTR"...)	Open IO path to LAN instrument at address 5
viOpen (... "GPIB2::3::INSTR "...)	Open IO path to LAN instrument at address 3
Cannot talk to instrument3	

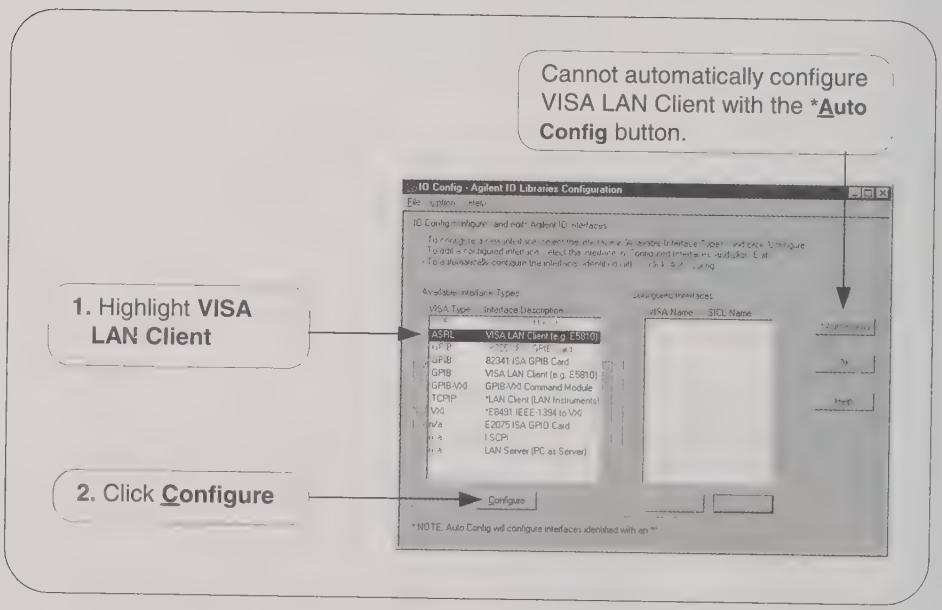
Configuring ASRL VISA LAN Client Interfaces

1 Click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config** to display the IO Config utility Main Screen.

2 When the main screen appears, highlight the **ASRL VISA LAN Client (e.g. E5810)** menu item and click the **Configure** button to display the **VISA LAN Client Interface (LAN to ASRL)** screen.

NOTE

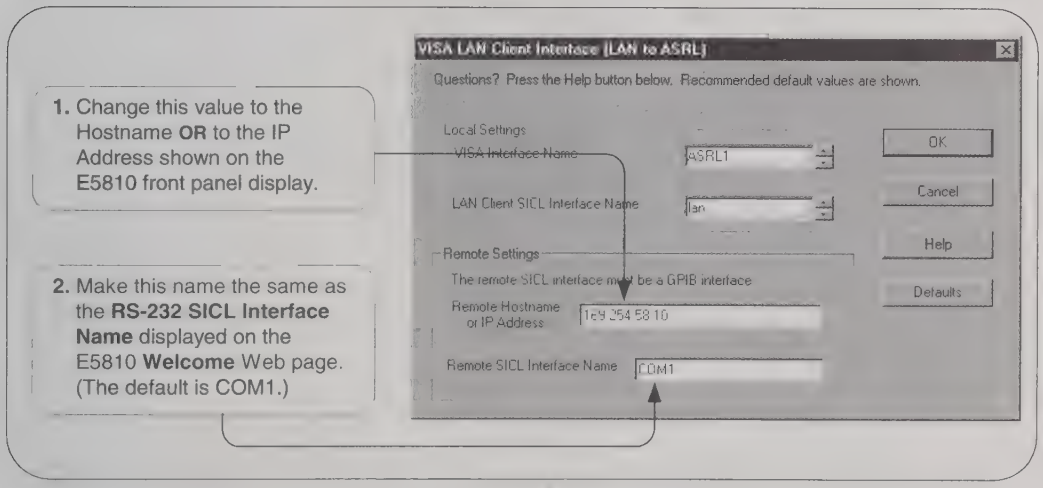
ASRL VISA LAN Client (e.g. E5810) *is not marked with an asterisk (*) (this interface is not Autoconfigurable) because you cannot use the* ****Auto Config*** *button to automatically configure the interface. Instead, you must manually configure the interface, as shown.*


Cannot automatically configure VISA LAN Client with the *Auto Config button.
1. Highlight VISA LAN Client
2. Click Configure
IO Config - Agilent IO Libraries Configuration
ASRL VISA LAN Client (e.g. E5810)
Configure

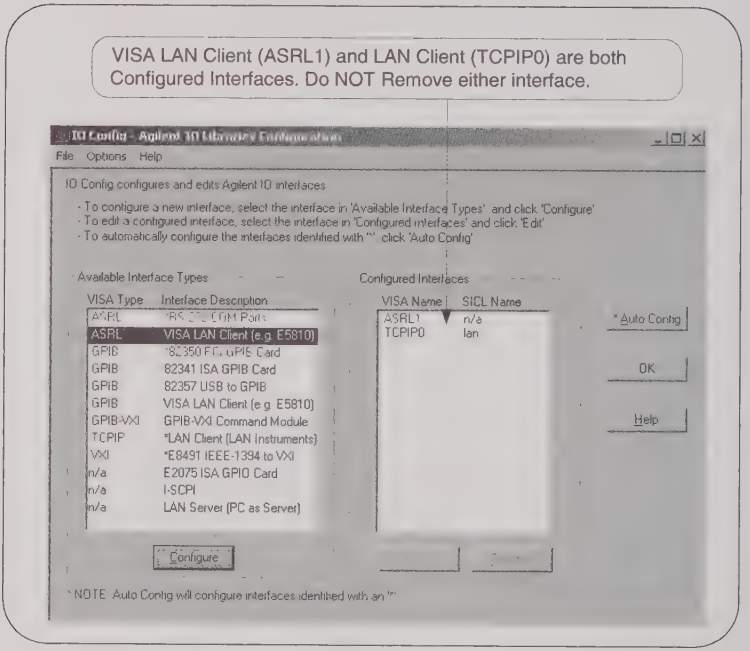
3 From the **VISA LAN Client Interface (LAN to ASRL)** screen appears, as required, set the **Remote Hostname** or **IP Address** and **Remote SICL Interface Name** as shown in the following figure. Then, click the **OK** button. See *Chapter 3 - Using E5810 Web Access* in the *E5810 LAN/GPIB Gateway for Windows User's Guide* for information on using the E5810 **Welcome** page.

NOTE

*After the system is configured, the **VISA LAN Client Interface (LAN to ASRL)** screen may also display an* `Edit VISA Config...` *button. Clicking this button allows you to manually configure the interface as desired. This optional feature is generally not required for the E5810.*


1. Change this value to the Hostname OR to the IP Address shown on the E5810 front panel display.
2. Make this name the same as the RS-232 SICL Interface Name displayed on the E5810 Welcome Web page. (The default is COM1.)
VISA LAN Client Interface [LAN to ASRL]
Questions? Press the Help button below. Recommended default values are shown.
Local Settings
VISA Interface Name
ASRL1
LAN Client SICL Interface Name
lan
Remote Settings
The remote SICL interface must be a GPIB interface
Remote Hostname or IP Address
169.254.58.10
Remote SICL Interface Name
COM1
OK
Cancel
Help
Defaults

4 **Do Not Delete the LAN Client Interface.** When the VISA LAN Client is configured, the LAN Client is also automatically configured in the background. Thus, when VISA LAN Client configuration completes, two configured interfaces are displayed on the IO Config main screen. See the following figure for a typical display. Do NOT remove the LAN Client or the VISA LAN Client interface, as the application will not run if either interface is removed.

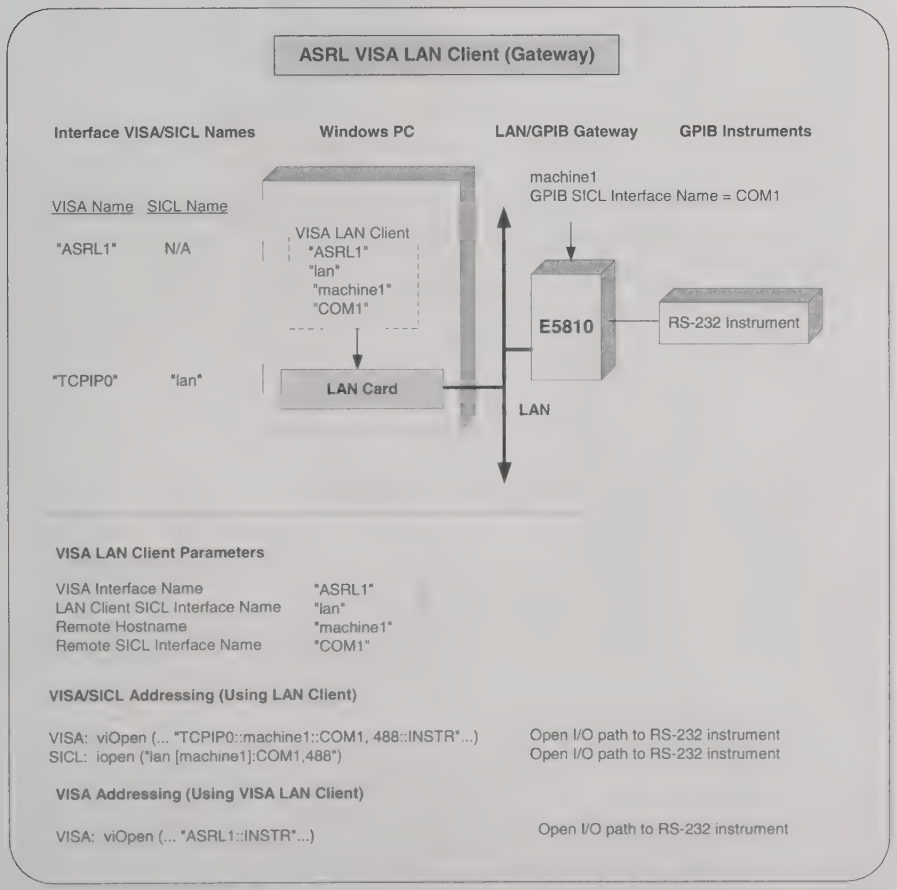

VISA LAN Client (ASRL1) and LAN Client (TCPIP0) are both Configured Interfaces. Do NOT Remove either interface.
File Options Help
IO Config configures and edits Agilent IO interfaces
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*' click 'Auto Config'
Available Interface Types
VISA Type
Interface Description
ASRL
VISA LAN Client (e.g. E5810)
GPIB
82341 ISA GPIB Card
GPIB
82357 USB to GPIB
GPIB
VISA LAN Client (e.g. E5810)
GPIB-VXI
GPIB-VXI Command Module
TCPIP
*LAN Client (LAN Instruments)
VXI
*E8491 IEEE-1394 to VXI
n/a
E2075 ISA GPIO Card
n/a
I-SCPI
n/a
LAN Server (PC as Server)
Configure
Configured Interfaces
VISA Name
SICL Name
ASRL1
n/a
TCPIP0
lan
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

Example: Configuring ASRL VISA LAN Client (E5810 Gateway) Interfaces

The ASRL interface system in the following figure consists of a Windows PC with one RS-232 instrument connected via a LAN cable, an E5810 LAN/GPIB Gateway, and an RS-232 cable. We will assume COM1 is the port used.

The IO Config utility has been used to assign COM port 1 a VISA name of "ASRL1" and SICL name of "COM1". The E5810 has been assigned a Hostname of "machine1" and a GPIB SICL Interface Name of COM1.

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command to open the I/O paths to the RS-232 instrument as shown in the figure.



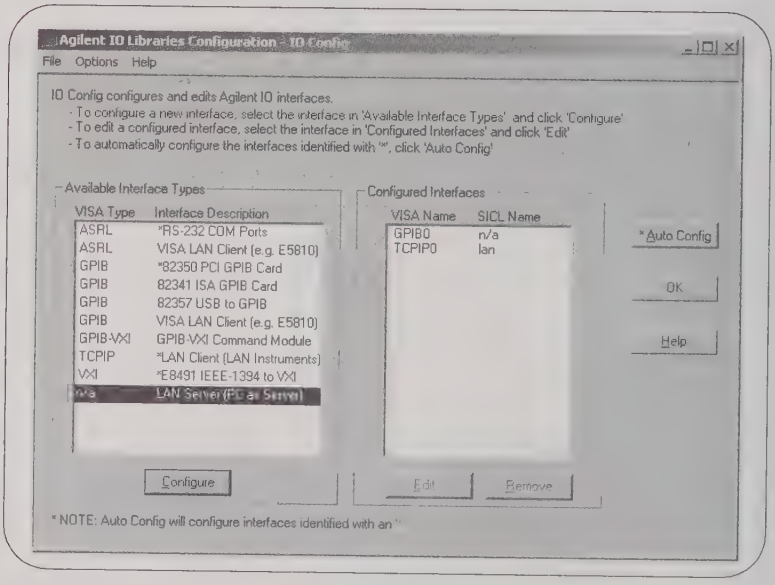
Configuring LAN Server Interfaces

NOTE

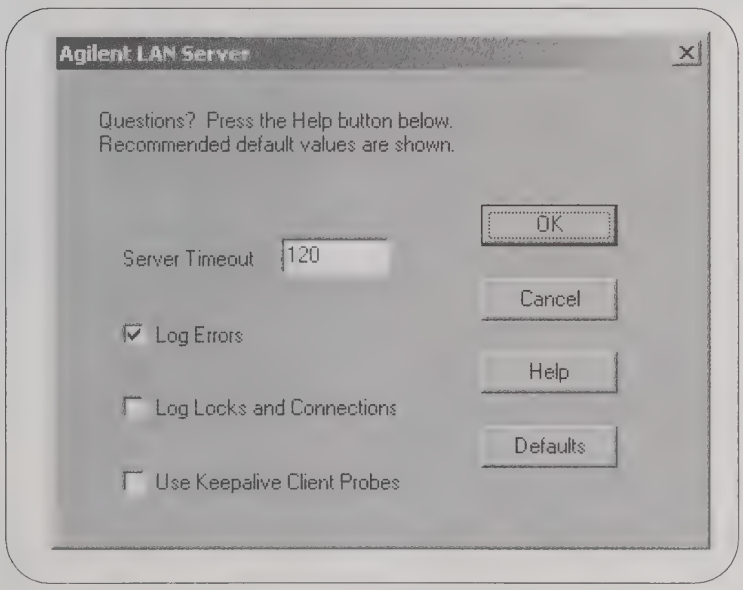
The LAN Server supports both VXI-11 and SICL-LAN protocol. However, the LAN Server does not support simultaneous connections from LAN clients using the SICL-LAN Protocol and from LAN clients using VXI-11 (TCP/IP Instrument Protocol).

Using IO Config to Configure LAN Server Interface

1 To configure LAN Server interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config**. When the main screen appears, highlight the **n/a LAN Server (PC as Server)** menu item and then click the **Configure** button.


Agilent IO Libraries Configuration - IO Config
File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB *82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB 82357 USB to GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a LAN Server(PC as Server)
Configured Interfaces
VISA Name SICL Name
GPIB0 n/a
TCPIP0 lan
*Auto Config
OK
Help
Configure
Edit
Remove
* NOTE: Auto Config will configure interfaces identified with an *

2 When the **Agilent LAN Server** screen appears, set the **Server Timeout** as required. Also, as required, set **Log Errors**, **Log Locks and Connections** and/or **Use Keepalive Client Probes**. Then, click the **OK** button.

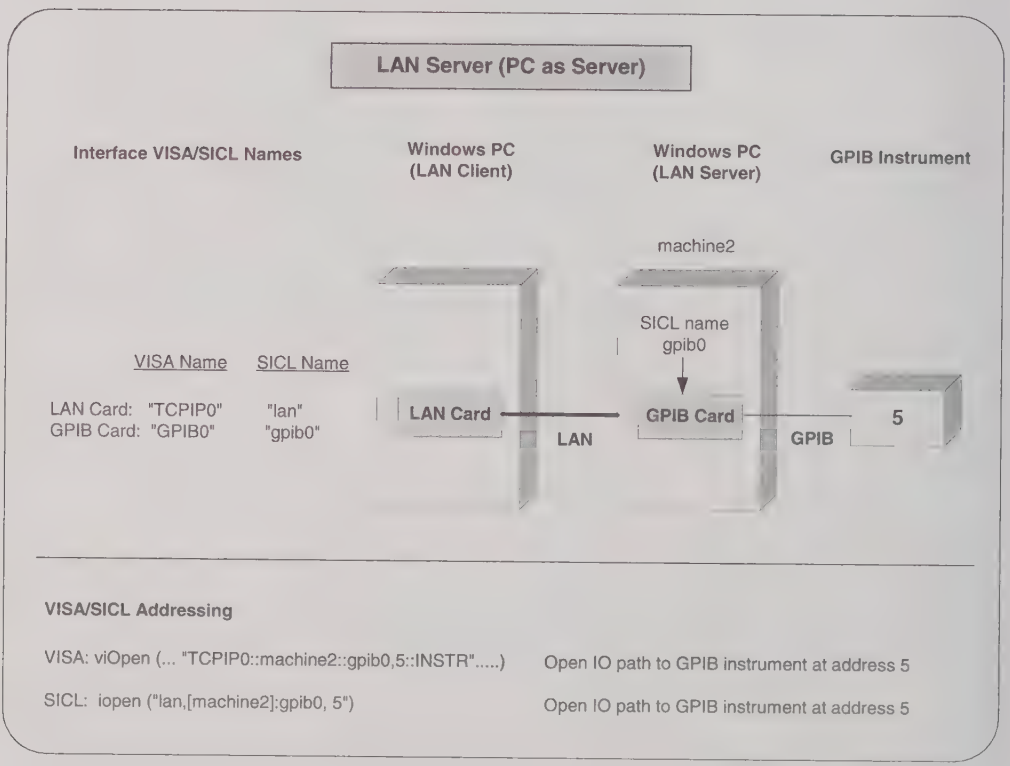


Example: Configuring LAN Server (PC as Server) Interfaces

The LAN Server interface system in the following figure consists of a Windows PC acting as a LAN client, a second PC acting as a LAN server, and a GPIB instrument. The IO Config utility has been used to assign the LAN card a VISA name of "TCPIP0" and SICL name of "lan".

Also, the GPIB card in the LAN server PC has been assigned VISA name of "GPIB0" and SICL name of "gpib0". The LAN server PC has been assigned a name of machine2.

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command or the SICL **`iopen`** command to open the I/O paths to the GPIB instruments as shown in the figure.



Configuring ASRL Interfaces

This section gives guidelines to use the IO Config utility to configure ASRL (RS-232) interfaces, including:

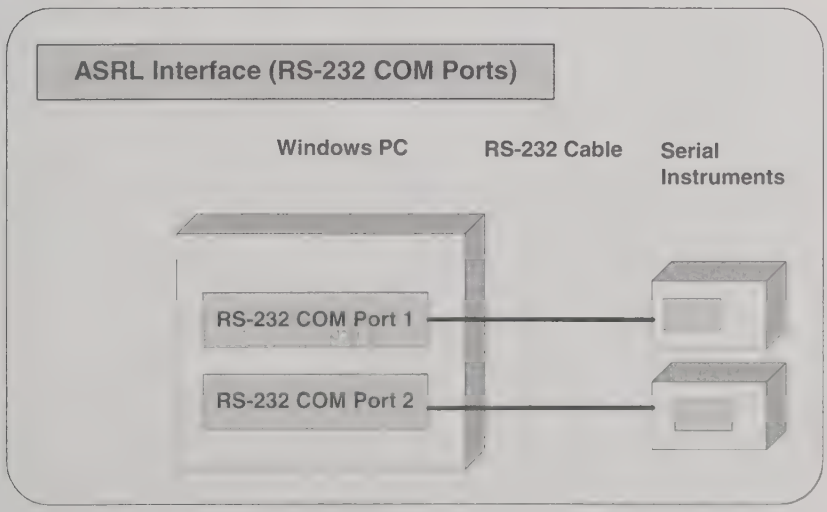
- ASRL Interfaces Overview
- Configuring ASRL (COM Ports) Interfaces

NOTE

To configure ASRL instruments via the LAN, see "Configuring ASRL VISA LAN Client Interfaces" in this chapter.

ASRL Interface Overview

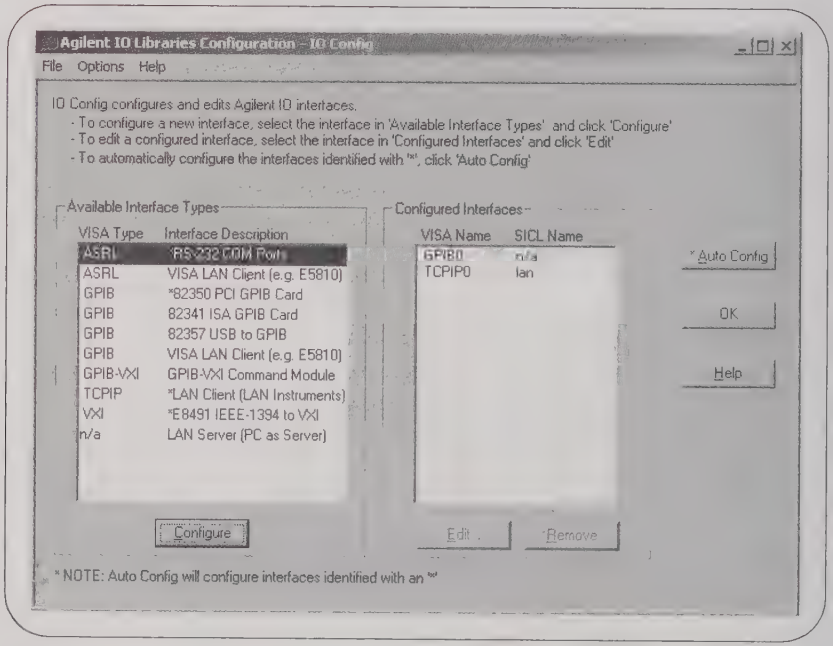
As shown in the following figure, a typical ASRL (RS-232) interface consists of a Windows PC with one or more RS-232 COM ports connected to RS-232 instruments. Each COM port can be connected to only one RS-232 instrument.



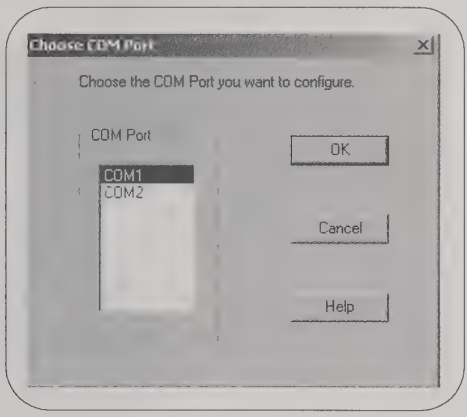
Configuring ASRL (RS-232 COM Ports) Interfaces

Using IO Config to Configure ASRL (RS-232 COM Ports) Interfaces

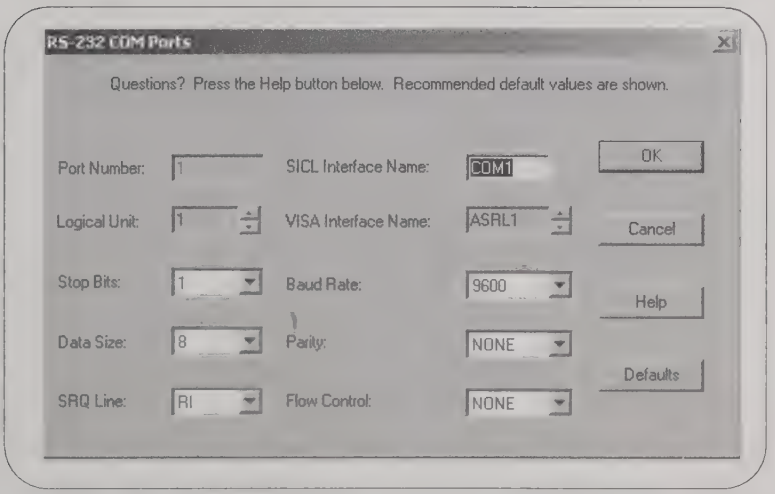
1 To configure ASRL (RS-232 COM Ports) interfaces using the IO Config utility, click the **Agilent IO Libraries Control** icon (blue icon on the Windows taskbar) and click **Run IO Config.** When the main screen appears, highlight the **ASRL RS-232 COM Ports** menu item and then click the **Configure** button.


Agilent IO Libraries Configuration - IO Config
File Options Help
IO Config configures and edits Agilent IO interfaces.
- To configure a new interface, select the interface in 'Available Interface Types' and click 'Configure'
- To edit a configured interface, select the interface in 'Configured Interfaces' and click 'Edit'
- To automatically configure the interfaces identified with '*', click 'Auto Config'
Available Interface Types
VISA Type Interface Description
ASRL *RS-232 COM Ports
ASRL VISA LAN Client (e.g. E5810)
GPIB *82350 PCI GPIB Card
GPIB 82341 ISA GPIB Card
GPIB 82357 USB to GPIB
GPIB VISA LAN Client (e.g. E5810)
GPIB-VXI GPIB-VXI Command Module
TCPIP *LAN Client (LAN Instruments)
VXI *E8491 IEEE-1394 to VXI
n/a LAN Server (PC as Server)
Configure
Configured Interfaces
VISA Name SICL Name
GPIB0 n/a
TCPIP0 lan
Edit...
Remove
* Auto Config
OK
Help
* NOTE: Auto Config will configure interfaces identified with an '*'

2 When the **Choose COM Ports** screen appears, highlight the desired COM port (**COM1** or **COM2**) and then click the **OK** button.



3 When the **RS-232 COM Ports** screen appears, set the **SICL** and **VISA Interface Names** and **Serial Port** attributes, as required and then click the **OK** button.

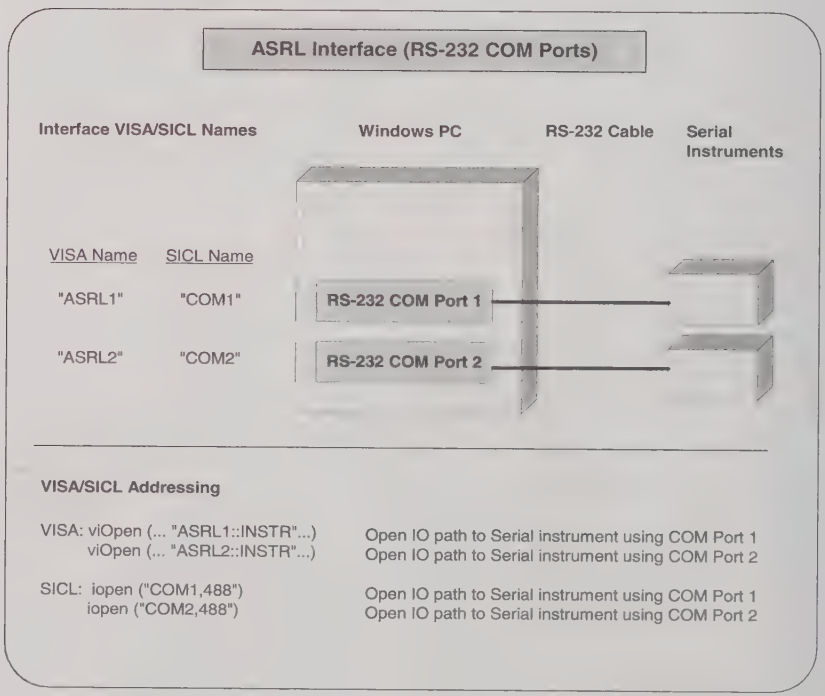


Example: Configuring ASRL (RS-232 COM Ports) Interfaces

The ASRL interface system in the following figure consists of a Windows PC with two RS-232 COM ports, each of which is connected to a single Serial instrument via RS-232 cables.

The IO Config utility has been used to assign COM Port 1 a VISA name of "ASRL1" and SICL name of "COM1". The IO Config utility has also been used to assign COM Port 2 a VISA name of "ASRL2" and SICL name of "COM2".

Since unique names have been assigned by IO Config, you can now use the VISA **`viOpen`** command to open the I/O paths to the Serial instruments as shown in the figure.



6

Agilent IO Libraries System Information

Agilent IO Libraries System Information

This chapter provides system information for the Agilent IO Libraries, including:

- General Information
- Installation Guidelines
- Application Notes
- Troubleshooting Guidelines

NOTE

You can view the latest Agilent IO Libraries information and download the latest revision from http://www.agilent.com/find/iolib. For notes, patches and bug fixes, see the Agilent IO Libraries support web page at http://www.agilent.com/find/iolib_support.

General Information

- What's New in This Version?
- Fixes in This Version
- Issues in This Version
- Known Limitations in This Version

What's New in This Version?

Item	Description
Agilent T&M Programmer's Toolkit	Support for *Agilent T&M Programmer's Toolkit for VisualStudio.NET* has been added.
Default SICL Name Changed to **`gpib0`**	When configuring a GPIB interface in IO Config, the default SICL name has been changed from **`hpib7`** to **`gpib0`**. For backwards compatibility, you can run IO Config and change the SICL name back to **`hpib7`**, if desired.
Microsoft library (.lib) Files Format Has Changed	The format of the Microsoft library (.lib) files in this release has changed. You must use Microsoft Visual C++ version 6.0 or later to link with the .lib files in this release. This change was required because the IO Libraries are now being built with MSVC 7 which does not offer a linker option to generate a .lib file in the older format.
Agilent IO Libraries Cannot Be Installed From Floppy Disks	It is no longer possible to install the Agilent IO Libraries from floppy disks. A self-installing IO Libraries executable is available but it can no longer be used to generate floppy disks for installation.
Microsoft Internet Explorer Version 4.0 Or Later Required (Windows NT 4.0)	On Windows NT 4.0, this version of the Agilent IO Libraries requires that Microsoft Internet Explorer version 4.0 or later be installed. The IO Libraries require the file *shlwapi.dll* which is not present on a bare Windows NT 4.0 installation, but this file is provided with Internet Explorer 4.0 or later.
Default IO Libraries Paths have Changed	Beginning with the J.01.00 release, the default paths for IO Libraries and VISA have changed to: *\Program Files\Agilent\IO Libraries* for SICL *\Program Files\VISA* for VISA If you are installing over a previous version of the IO Libraries, the directories will not be changed.

Item	Description
Hewlett-Packard to Agilent Transition	The IO Libraries product, beginning with revision J.01.00, has been rebranded from Hewlett-Packard to Agilent Technologies. A number of changes have been made to the IO hardware, software and documentation to reflect this change. (Since documentation and product rebranding is in progress, some entries may still show HP rather than Agilent.) ■ The name of the HP I/O Libraries Control has been changed to Agilent IO Libraries Control. ■ The name of the IO Libraries folder under **Start**	**Programs** has changed from 'HP I_O Libraries' to 'Agilent IO Libraries'. ■ The 'HP' prefix to the shortcut names in the 'Agilent IO Libraries' folder has been removed. ■ The icons used for various IO Libraries components no longer use an HP logo. ■ When using the **Add/Remove Programs** applet in the Control Panel, 'HP I/O Libraries' has been replaced by 'Agilent IO Libraries'. ■ References to HP-IB have been changed to GPIB throughout the product. Beginning in the L.02.00 revision, the default GPIB name assigned by IO Config was changed from **hpib7** to **gpib0**. If your application requires the **hpib7** name, you can specify it in IO Config rather that accepting the new default. ■ `VI_ATTR_RSRC_MANF_ID` has not changed, it still returns 0xfff. This VXI manufacturer ID is now owned by Agilent. `VI_ATTR_RSRC_MANF_NAME` now returns **Agilent Technologies** rather than **Hewlett-Packard**.
`viLock` Functions Enhanced	On VISA INSTR resources (and only on INSTR resources), the `viLock` function with `VI_EXCLUSIVE_LOCK` now obtains an underlying SICL lock as well. In addition, a new Agilent-specific VISA ViBoolean local (per-session) attribute, `VI_AGATTR_LOCKWAIT`, has been added. See "Locking with viLock" in Application Notes in this chapter for details.

Item	Description
Format Specifier Behavior has Changed	The behavior of the %#s, %#S, %#t and %#T format specifier in the SICL **`iscanf`** and **`ipromptf`** functions and the VISA **`viScanf`** and **`viQueryf`** function has changed. The '#' symbol signifies that a pointer to an integer is present the function argument list. On entry to the function the value of the integer is now the maximum size of the string being read including the trailing NULL character. Previously, this size did not include the trailing NULL character and the number of characters written (including the NULL) could be one more than the size passed in. When the function returns, the value of this integer is set to the number of characters written to the string excluding the trailing NULL. The return value behavior has not changed from previous revisions of the IO Libraries.
I-SCPI Support	I-SCPI support has been removed from this version of the Agilent IO Libraries. Use version L.01.01 or earlier if you still require I-SCPI. Upgrading an earlier version of the IO Libraries to L.02.00 will not remove I-SCPI if it had been installed in the earlier version. I-SCPI was implemented ONLY for BACKWARD COMPATIBILITY and migration purposes. It should not be used for new designs. Additional I-SCPI information is available in the file (assuming default file locations): ■ *C:\program files\visa\winnt\bin\iscpinfo.txt* (Windows NT) or ■ *C:\program files\visa\win95\bin\iscpinfo.txt* (Windows 95/98) Beginning with version G.02.00 of the IO Libraries, the 32 bit I-SCPI drivers have changed from a SICL to a VISA-based implementation. This change should be invisible to you. Programs which use I-SCPI should continue to function without modification unless a VISA-based I-SCPI driver is not available for an instrument you are using. There will be no new development on the SICL-based I-SCPI drivers. Although the I-SCPI drivers in this implementation are VISA-based, I-SCPI may only be used with SICL programs. VISA programs cannot use I-SCPI. The Agilent E8491 IEEE-1394 to VXI product will only work with the VISA-based I-SCPI drivers.

Item	Description
I-SCPI Support (cont'd)	Currently, VISA-based I-SCPI drivers are not available for the DDCC-1553 and E1450. If you are using I-SCPI with these devices, you will need to use the SICL-based I-SCPI drivers which are not available on this release of the IO Libraries. If you need to use the SICL based I-SCPI drivers, do not upgrade to this version of the IO Libraries. Version G.02.02 was the last version of the Agilent IO Libraries to contain support for SICL based I-SCPI Please contact Agilent for the latest information.
LAN Client Support	An **AUTO** mode has been added to the LAN Client in IO Config. When **AUTO** mode is chosen, a single LAN interface will support both the SICL-LAN and the VXI-11 (TCP/IP Instrument) protocol. It is also possible to specify the LAN protocol in the SICL **iopen** string that overrides the IO Config setting. Some examples are: ■ **`iopen("lan[machineName]:gpib0,1")`** will use the configured default protocol. If AUTO is configured, SICL-LAN protocol will be attempted and, if that is not supported, VXI-11 protocol will be used. ■ **`iopen("lan;auto[machineName]:gpib0,1")`** will automatically select the protocol. (SICL-LAN if available and VXI-11 otherwise.) ■ **`iopen("lan;sicl-lan[machineName]:gpib0,1")`** will use SICL-LAN protocol. ■ **`iopen( "lan;vxi-11[machineName]:gpib07,1")`** will use VXI-11 protocol. The LAN Client now also supports TCP/IP socket reads and writes. To open an socket session, use the following format: **`iopen("lan,socketNbr[machineName]")`**. For example, **`iopen("lan,7777[machineName]")`** will open a socket connection for socket number 7777 on 'machineName'.

Item	Description
LAN Server Support	This implementation of the Agilent IO Libraries supports both the VXI-11 (TCP/IP Instrument Protocol) and the SICL-LAN protocol. Usage is **`siclland [option]`**, where **`option`** is: ■ ALL (or no parameters) - support both protocols ■ VXI-11 - support only the VXI-11 protocol ■ SICL-LAN - support only the SICL-LAN protocol The LAN server on Windows NT/2000 does not start automatically after a reboot. You need to either start it manually by double-clicking its icon in the Agilent IO Libraries folder, or you can create a shortcut to it in your StartUp folder. This implementation differs from the VXI-11 specification in the following ways: ■ The device_abort RPC is not supported. ■ Rules B.4.17 and B.4.18 of VXI-11.1 are not supported by the current implementation. As noted in observation B.5.1 of VXI-11.1, changes are anticipated to VXI-5. Due to these possible changes and the fact that the current revision of VXI-5 does not require that any particular VXI-5 commands be implemented, the current LAN server implementation does not support VXI-5 operations.

Fixes in This Version

Fix	Description
82357 USB/GPIB Over-Current Problem	An over-current problem which prevented the 82357 USB/GPIB from working on some laptops has been fixed.
For Visual Basic users, the *sicl4.bas* file has been replaced with *sicl32.bas.*	For Visual Basic users, the *sicl4.bas* file has been replaced with *sicl32.bas. Sicl32.bas* removes the conditionally defined references to the old 16-bit *sicl16.dll.* These references did not cause a problem when calling SICL functions from Visual Basic but the Visual Basic distribution wrapper application would fail, complaining that it could not find *sicl16.dll* when a developer attempted to package his/her VB program for distribution.
SICL **isetlockwait** problem fixed	A SICL **`isetlockwait`** problem where a function could return a bogus **`VI_ERROR_LOCKED`** error when **`isetlockwait`** was **`0`** has been fixed. On the 82341C and 82350A GPIB cards with **`isetlockwait`** set to **`0`**, it was possible to get an **`I_ERR_LOCKED`** error returned from a function (such as **`iwrite`**) if two threads were attempting to access different devices on the same interface even though neither device was locked.
Fast User Switching on Windows XP Professional	IO Libraries will now function correctly if more than one user is logged on using Fast User Switching on Windows XP Professional. Fast User Switching is a new feature that has been added to Windows XP Professional which allows more than one user to be logged on at one time and to quickly switch between these logged on users. The Agilent IO Control is run automatically when the first user logs in and it will be terminated when that user logs out. For interfaces that rely on the IO Control to function properly, such as the E8491 (VXI) and 82357 (USB to GPIB), the first user must not log out as long as any user requires access to these interfaces. Users other than the first user will not see the IO Control icon on the task bar.

Issues in This Version

Issue	Description
Use of the %F (file pointer) SICL format specifier is not recommended.	The %F specifier uses a file pointer returned from an **`fopen`** call. If this pointer is opened in an application and passed to a DLL (as it is will be to *Sicl32.dll* when calling **`iprintf`** or **`iscanf`**), it will only be valid if both the application and the DLL load the same copy of the runtime libraries. *Sicl32.dll* is built using the Microsoft mult-threaded DLL version of the runtime libraries. Since Agilent routinely upgrades to newer versions of Microsoft Visual C as new versions of the Agilent IO Libraries are developed, applications which use the %F format specifier that were compiled to work with one version of the Agilent IO Libraries will fail (usually with an access violation) when run under a newer version.
82357 USB/GPIB Gateway will not install correctly on Windows 98 (SE) if *usbscan.sys* is not present.	The 82357 USB/GPIB Gateway will fail to install correctly on Windows 98 (SE) systems if *usbscan.sys* is not present. *usbscan.sys* is a Microsoft driver required for 82357 operation, but may not be installed on some Windows 98 systems. If *usbscan.sys* is not present on your system, after installing the Agilent IO Libraries and then connecting an 82357, the **Adding New Hardware** wizard will prompt you for the location of *usbscan.sys*. This file is present on the Windows 98 (SE) installation disk. For detailed instructions on this topic, see "USB/GPIB (82357) Interface Troubleshooting".

Issue	Description
GPIB/GPIO Card Support on Windows	After installing and configuring an 82341 ISA GPIB card on Windows NT 4.0/9x, a reboot may be required even though the installation program does not request a reboot. 82341C GPIB cards and E2075A GPIO cards are not supported on Windows Me. Due to Windows configuration manager changes made by Microsoft, these ISA cards are very difficult to configure and can cause the computer to hang during the configuration process. The 82341D GPIB card is not supported on Windows 2000. However, the 82341C card is supported on Windows 2000.
VXI (E8491) Support	The Adaptec PCI to 1394 card which originally shipped with the E8491 VXI to IEEE-1394 interface is not supported on Windows 2000. This original card was not OHCI-compliant and only OHCI 1394 cards are supported on Windows 2000. The E8491 is now shipping with an OHCI compliant card which is supported on Windows 2000.
Memory Leak in Windows 98	There is a memory leak in Windows 98 which may affect the IO Libraries operation. We have observed a 4 Kb memory leak each time any program that dynamically links the Microsoft *msvcrt.dll* (even a program that does not do IO) is run and then exits on Windows 98. This DLL is the C runtime library supplied with Microsoft Visual Studio and it is used by many products. The IO Libraries dynamically link to *msvcrt.dll*, so any program using SICL and/or Agilent VISA will exhibit this problem. If your application involves starting and stopping programs many times, you will eventually run out of memory. Windows 98 will gradually become sluggish and eventually quit. The only solution to this problem is to reboot. We are reporting this defect to Microsoft but there is no resolution yet available. **NOTE:** If, in Microsoft Visual Studio, you choose **Multithreaded DLL** in the **Use run-time library:** box on the C/C++ Code Generation tab, your application will dynamically load *msvcrt.dll*.

Issue	Description
Some E8491 Topologies May Not Work	When three or more E8491s are connected to a single IEEE-1394 interface card, certain topologies may not work. In certain topologies the E8491 hardware is not properly identified on the 1394 bus. This will result in inconsistent behavior when the VXI resource manager tries to configure instruments in the VXI card cages. Behavior may include timeout errors while attempting to communicate with a particular instrument, and/or instruments appearing in cages where they are not actually located . Try reversing the cable connections to the ports on the host interface card. In general, cable connections with longer chains of E8491s should be on lower host ports.
Do Not Re-run Setup too Quickly	Do not re-run setup too quickly. After the IO Libraries Setup program exits, it takes several seconds to clean up and unload itself from memory. If Setup is re-run before this process is complete, you may see an error message or find that the re-installation does not behave as expected. Be sure to wait until the **InstallShield Wizard** box on the Windows task bar has disappeared before attempting to re-run the IO Libraries Setup.
Installing On Dual-Boot Systems Can Cause Problems	Installing the IO Libraries on dual-boot systems that share a common *Program Files* directory between two operating systems is not recommended and may cause problems. If the IO Libraries are installed in the same directory for both operating systems (such as *Program Files\Agilent\IO Libraries*), files for one OS may overwrite files for the other OS. InstallShield uses a directory under *Program Files* to log the name and location of files for later uninstall as well as the components that are currently installed. Uninstalling or modifying an installation on one OS may affect the files for the other OS rather that the currently booted OS, even if these files are installed in different directories.

Issue	Description
After Installing an E8491 on Windows 95/98, Windows May fail to Boot	When adding paths to the PATH statement in AUTOEXEC.BAT, InstallShield does not recognize **@PATH** as a path statement. It will create a second **SET PATH** statement. If there is a second PATH statement, it will replace the existing Windows PATH and end up removing the Windows directories from the PATH. If Windows fails to boot with a message **Cannot find WIN.COM, unable to continue loading Windows**, you will need to edit the additional PATH statement in AUTOEXEC.BAT so the Windows directories are again included in the PATH. **1** From the DOS prompt type *c:\windows\command\edit c:\autoexec.bat*. (Substitute the actual paths if you have a non-standard installation.) **2** Find the last **SET PATH=...** statement and insert **%path%;** immediately after the equal sign (for example, **SET PATH=%path%;...** and be sure to insert the semicolon separator.) **3** Save the modified file and reboot. Windows should now boot normally. If the E8491 is very busy and an IEEE-1394 bus reset occurs, it may become unresponsive and require a reset of the E8491 and/or a reboot of the computer. This problem can occur when another IEEE-1394 device is added or removed while the E8491 is busy.

Known Limitations in This Version

Limitation	Description
Turn Off Standby Mode	Problems have been observed with standby mode operation. You should turn off standby mode on your computer when using the Agilent IO Libraries. Do this using Control Panel, Power Options or Control Panel, Power Management.
SICL for Windows 95/98/NT does not support Visual Basic for Applications	SICL for Windows 95/98/NT supports Microsoft Visual Basic, but it does not support Visual Basic for Applications included with applications such as Microsoft Excel.
Limits on Using the 82335 GPIB Interface	Using the Agilent 82335 GPIB interface with both SICL and the HP-IB Command Library at the same time on the same interface is not supported. No error will be reported, but unexpected results could occur. Note that the Agilent 82335 GPIB interface is not supported on Windows NT.
Closing a Session When an Interrupt is Executing	Calling `iclose()` on a session while an interrupt or SRQ handler is executing for that session can cause unexpected results. You should ensure that this cannot happen in your application.
Multi-CPU Operation Not Supported for 82341 or E2075A	Multi-CPU operation (available on Windows NT/2000) is not supported with the 82341 ISA GPIB card or the E2075A ISA GPIO card.

Limitation	Description
Calling SICL/VISA Functions from Within a DLL Entry-Point Function is not Supported	Calling SICL and VISA functions from within a DLL entry-point function (such as *DllMain*) is not supported. The SICL **`iopen`** call (which is also used from within a VISA **`viOpen`** call) creates an interrupt thread and waits for it to start. Windows will not start the newly created thread until the entry-point function terminates and thus a deadlock will occur. The following excerpt from the DllMain documentation on the April 2001 *MDSN Library* summarizes good programming practice for a DLL entry-point function (Refer to the *MDSN Library* for more detailed information.): "Warning: On attach, the body of your DLL entry-point function should perform only simple initialization tasks, such as setting up thread local storage (TLS), creating synchronization objects, and opening files. You must not call LoadLibrary in the entry-point function, because you may create dependency loops in the DLL load order. This can result in a DLL being used before the system has executed its initialization code. Similarly, you must not call the FreeLibrary function in the entry-point function on detach, because this can result in a DLL being used after the system has executed its termination code."
Calling Certain Win32 Functions from Within a DLL Entry-Point Function may Cause Problems.	Calling Win32 functions other than TLS, object-creation, and file functions from within a DLL entry-point function may result in problems that are difficult to diagnose. For example, calling User, Shell, COM, RPC, and Windows Sockets functions (or any functions that call these functions) can cause access violation errors, because their DLLs call LoadLibrary to load other system components. While it is acceptable to create synchronization objects in DllMain, you should not perform synchronization in DllMain (or a function called by DllMain) because all calls to DllMain are serialized. Waiting on synchronization objects in DllMain can cause a deadlock. To provide more complex initialization, create an initialization routine for the DLL. You can require applications to call the initialization routine before calling any other routines in the DLL. Otherwise, you can have the initialization routine create a named *mutex*, and have each routine in the DLL call the initialization routine if the *mutex* does not exist.

Installation Guidelines

- Guidelines to Configure I/O Interfaces
- Upgrading Agilent IO Libraries
- Manually Uninstalling the Agilent IO Libraries
- Interoperating in National Instruments VISA Systems

NOTE

***Install Software First**. Although Agilent previously recommended you install new I/O hardware before installing the Agilent IO Libraries, we now recommend you install the Agilent IO Libraries software first. After installing new I/O hardware, you must re-run IO Config to configure newly-added hardware before the hardware can be used with the Agilent IO Libraries software.*

Guidelines to Configure I/O Interfaces

This section gives guidelines to configure 82350 and E8491 I/O hardware interfaces. After the Agilent IO Libraries are installed on your PC and the I/O hardware is installed on your system, you must configure each hardware interface before it can be used with SICL or Agilent VISA. Do this using the IO Config utility.

After the Agilent IO Libraries are installed, you can access IO Config from the Agilent IO Libraries Control (blue IO icon on the Windows taskbar). Click the IO icon and then click **Run IO Config**. Guidelines to configure I/O interfaces using IO Config follow.

- If you installed the Agilent IO Libraries before you installed the I/O hardware, go to "If You Installed the Libraries First"
- If you installed the the I/O hardware **before** you installed the Agilent IO Libraries, go to "If You Installed the I/O Hardware First"

If You Installed the Libraries First

1. After installing the Agilent IO Libraries software, select the **Do not configure interfaces now** option at the end of the installation process. You will configure interfaces after the hardware is installed.

2. Shut down the computer and turn the power off before installing I/O hardware. If you are configuring the 82350, go to Step 2 (a). If you are configuring an E8491, go to Step 2(b).

   a. **82350 PCI GPIB Card:** Install the Agilent 82350 PCI GPIB card and power up the computer. For Windows 95/98/Me, the **Found New Hardware Wizard** will start. Use this Wizard to complete the installation as shown in the following steps:

      - **Windows 95:** When the Wizard asks for the IO Libraries CD, click **OK**. When the Wizard asks for the *ag350i32.vxd* file, browse to *C:\windows\system* and click **OK.**

      - **Windows 98/Me:** When the Wizard asks for the IO Libraries CD, click **OK**. When the Wizard asks for the *hpioclas.dll* file, browse to *C:\windows\system* and click **OK**.

   b. **E8491 VXI Interface:** Install a 1394 FireWire card. Recent 1394 cards have a separate power connector. Be sure the power cable is plugged in. Use a FireWire cable to connect the 1394 card to an E8491B VXI interface card in a VXI mainframe.

      Power up the mainframe and then power up the computer. On Windows 95/98/Me, the **Found New Hardware Wizard** will start. Use this Wizard to complete the installation as shown in the following steps:

> **NOTE**
>
> *If, on Windows 98/2000, you attempt to configure an E8491 card but none were found on your system, make sure all your VXI mainframes are powered on and your 1394 cables are connected before running IO Config. If you are still having trouble, see "VXI (E8491) Interface Troubleshooting".*

- **Windows 95:** If the Wizard asks for the IO Libraries CD, click **OK**. When the Wizard asks for the *wn1394.vxd* file, browse to *C:\windows\system* and click **OK**.
- **Windows 98:** If the Wizard asks for the *1394bus.sys* file, you must provide the CD for the Windows 98 operating system and let the Wizard search for and install the file.

  When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. Then, browse to *C:\Winnt\system32\drivers* and click **OK**.
- **Windows Me:** When the Wizard asks for the IO Libraries CD, provide the CD or continue to where the Wizard asks for the *1394ipt.sys* file. Then, browse to *C:\Winnt\system32\drivers* and click **OK**.

3. Run the Agilent IO Libraries IO Config utility and configure the interface card(s) as required. See *Chapter 5 - Configuring I/O Interfaces* for details.
4. Restart your computer.

If You Installed the I/O Hardware First:

If you installed the I/O hardware before installing the Agilent IO Libraries software, use these steps to install the Agilent IO Libraries software. If you installed an 82350 card, go to Step 1. If you installed an E8491 card, go to Step 2.

1. **82350 PCI GPIB Card Was Installed:** Use the following steps for your OS.
   - **Windows 2000:** The **Found New Hardware Wizard** will identify this card as a **PCI Simple Communications Controller**. The driver is located in the *\Windows 2000* directory on the *Agilent IO Libraries for Instrument Control* CD.
   - **Windows NT 4.0:** Since Windows NT is not a VXI*plug&play* OS, all necessary driver installation and configuration is performed when you install the Agilent IO Libraries.

- **Windows 95/98:** The **Add New Hardware Wizard** will identify this card as a **PCI Communication Device**. The files needed for this device are located at the root of the *Agilent IO Libraries for Instrument Control* CD. After searching for a driver, Windows will find an updated driver for a 'Hewlett-Packard 82350A PCI HP-IB'.

NOTE

You may be asked insert the 'HP I/O Libraries' CD. You should use the Agilent IO Libraries CD in this case. The card will be identified as a Hewlett-Packard card. This is necessary for backward compatibility.

2 **E8491 VXI interface Card was Installed:** If you installed a 1394 OHCI card and want to configure an E8491, you should install the 1394 card in the computer, connect the 1394 cable between the card and the E8491 and power up the VXI mainframe before booting the computer. Then, use the following steps for your OS.

a **Windows 98/2000:**

- **OHCI Card Driver:** If the **Found New Hardware Wizard** appears and prompts you to install the driver for a 'Texas Instruments OHCI Compliant IEEE 1394 Host Controller', you will need to get and install the drivers for this card from the Windows 2000 CD that came with your computer. These drivers may already be installed. In that case, the **Found New Hardware Wizard** for this device will not appear.

- **E8491 Driver:** If the Found New Hardware Wizard appears and prompts you to install the driver for a 'Hewlett-Packard HP8491A', you can find the driver for this device (*1394ipt.inf*) in the *\Windows 2000* subdirectory of the *Agilent IO Libraries for Instrument Control* CD.

b **Windows NT 4.0:** Since Windows NT is not a VXI*plug&play* OS, all necessary driver installation and configuration is performed when you install the Agilent IO Libraries.

c **Windows 95:**

- ❑ **OHCI Card Driver:** If the **Update Device Driver Wizard** appears and prompts you to install the driver for a 'PCI Firewire (IEEE- 1394)' card, After searching, Windows will find an updated driver for a 'HP AHA-8940 PCI to IEEE 1394 Host Controller'. The driver needed (*wn1394.vxd*) can be found at the root of the *Agilent IO Libraries for Instrument Control* CD.

- ❑ **E8491 Driver:** This driver will be installed automatically when you install the Agilent IO Libraries.

3 After the drivers for all new cards are installed, you can run **Setup** from the *Agilent IO Libraries for Instrument Control* CD to install and configure the Agilent IO Libraries.

Upgrading Agilent IO Libraries

When upgrading from an earlier version of the Agilent IO Libraries, the installer will upgrade your current installation, but it will not allow you to change any installation options. If you want to change installation options, you must first upgrade the Agilent IO Libraries and the re-run the installation program.

When you re-run the installation program, you can choose the **Modify** option to change installation options. Some considerations follow for upgrading the Agilent IO Libraries.

- **Do not re-run setup too quickly.** After the IO Libraries Setup program exits, it takes several seconds to clean up and unload itself from memory. If Setup is re-run before this process is complete, you may see an error message or find that the re-installation does not behave as expected. Be sure to wait until the **InstallShield Wizard** box on the Windows task bar has disappeared before attempting to re-run the Agilent IO Libraries Setup.

- **Installing on dual-boot systems can cause problems.** Installing the Agilent IO Libraries on dual-boot systems that share a common *Program Files* directory between two operating systems is not recommended and may cause problems. If the Agilent IO Libraries are installed in the same directory for both operating systems (such as *Program Files\Agilent\IO Libraries*), files for one OS may overwrite files for the other OS.

InstallShield uses a directory under *Program Files* to log the name and location of files for later uninstall as well as the components that are currently installed. Uninstalling or modifying an installation on one OS may affect the files for the other OS rather that the currently booted OS, even if these files are installed in different directories.

- **After installation on Windows 95/98, Windows may fail to boot.** When adding paths to the PATH statement in AUTOEXEC.BAT, InstallShield does not recognize **@PATH** as a path statement. It will create a second **SET PATH** statement. If there is a second PATH statement, it will replace the existing Windows PATH and end up removing the Windows directories from the PATH.

  If Windows fails to boot with a message **Cannot find WIN.COM, unable to continue loading Windows**, you will need to edit the additional PATH statement in AUTOEXEC.BAT so the Windows directories are again included in the PATH.

  - From the DOS prompt type *c:\windows\command\edit c:\autoexec.bat*. (Substitute the actual paths if you have a non-standard installation.)
  - Find the last **SET PATH=...** statement and insert **%path%;** immediately after the equal sign. (such as **SET PATH=%path%;...** and do not forget the semicolon separator.)
  - Save the modified file and reboot. Windows should now boot normally.

- **Electronic Manuals will not run from the Agilent IO Libraries Control.** You need to have Adobe Acrobat installed to view the electronic IO Libraries manuals. If you select a manual from the **Program | Agilent IO Libraries** menu, you will see an **Open With** dialog box.

  If you select a manual from the Agilent IO Libraries Control **View Documentation** menu, and Adobe Acrobat Reader is not installed, nothing will happen. You can install Adobe Acrobat from the Adobe directory on the *Agilent IO Libraries for Instrument Control* CD or you can download it from `www.adobe.com`.

Manually Uninstalling the Agilent IO Libraries

In rare cases, when you uninstall the Agilent IO Libraries, they may not be completely removed. Uninstall problems are usually the result of an IO Libraries installation that failed before completing normally, or installing an old version of certain Agilent drivers after a newer version of the IO Libraries are installed.

CAUTION

Manually uninstalling the Agilent IO Libraries requires editing the registry and removing files from system directories. Be sure you have backed up your system. Mistakes when editing registry entries or removing system files can make your machine unbootable.

The file paths in these steps are for the default installation paths on a machine running Microsoft Windows XP Professional. If you are running a different operating system or if the Agilent IO Libraries are installed in other than the default paths, substitute the actual installation paths in the instructions.

You should also look for IO Libraries files that may have previously been installed in non-default locations and remove them as well. A user may have chosen any directory for installing the IO Libraries but the common defaults are as follows.

- The current default Agilent IO Libraries path is *C:\Program Files\Agilent\IO Libraries*, but previous versions of the Agilent IO Libraries may have used *C:\SICL*, *C:\SICLNT* or *C:\SICL95*.
- The current default VISA path is *C:\Program Files\VISA*, but previous versions of the Agilent IO Libraries may have used *C:\VXIPNP*.
- Depending on the operating system, the Windows System path may be *C:\winnt\system32*, *C:\windows\system32*, or *C:\windows\system* (on Windows 95/98/Me)

Carefully follow these steps to manually uninstall the Agilent IO Libraries from your system.

1. Remove all applications that rely on VISA or the Agilent IO Libraries
2. Remove any other vendor's IO Libraries (such as National Instrument's VISA)
3. Run the Agilent IO Libraries Installation program and select the **Remove** option.
4. Run **Regedit** and make the following registry edits. Carefully follow these steps so you will not remove entries that are not related to the Agilent IO Libraries.
   a. Remove the following keys and all their subkeys if they exist:
      - ❑ *HKEY_LOCAL_MACHINE\SOFTWARE\Agilent\IO Libraries*
      - ❑ *HKEY_LOCAL_MACHINE\SOFTWARE\Hewlett-Packard\SICL*
      - ❑ *HKEY_LOCAL_MACHINE\SOFTWARE\VXIPNP_Alliance\VXIPNP\CurrentVersion*
5. Navigate to *HKEY_LOCAL_MACHINE\SOFTWARE\ Microsoft\ Windows\CurrentVersion\SharedDLLs* and remove the following values if they exist:
   - ❑ All values pointing to files in the *C:\Program Files\ Agilent\IO Libraries* directory
   - ❑ All values pointing to files in the *C:\Program Files\VISA* directory
   - ❑ The values from the Windows system directory that refer to the files in the Windows File List below.
6. Exit **Regedit**

7 Remove the following directories and files. Carefully follow the instructions so you will not remove files that are not related to the Agilent IO Libraries.

- ❑ The *C:\Program Files\Agilent\IO Libraries* directory and all files and subdirectories in it.
- ❑ The *C:\Program Files\VISA* directory and all files and subdirectories in it.
- ❑ The following Agilent IO Libraries files located in the Windows directory:

c:\windows\inf\1394ipt.inf
c:\windows\inf\ag357.inf
c:\windows\inf\agtgpib.inf
c:\windows\inf\agtgpio.inf
c:\windows\inf\gpio.inf
c:\windows\inf\hpib.inf
c:\windows\inf\wn1394.inf (on Windows 95)

- ❑ The following *<WINSYSDIR>* files typically located in *c:\windows\system32* or *c:\winnt\system32* on Windows NT/2000/XP Professional or in *c:\windows\system* on Windows 95/98/Me.

<WINSYSDIR>\1394ipt.dll
<WINSYSDIR>\82357ipt.dll
<WINSYSDIR>\ag341i32.vxd (Windows 95/98/Me)
<WINSYSDIR>\ag350i32.vxd (Windows 95/98/Me)
<WINSYSDIR>\agtgpibclass.dll
<WINSYSDIR>\agvisa32.dll
<WINSYSDIR>\agvisaext.dll
<WINSYSDIR>\hpioclas.dll (Windows 95/98/Me)
<WINSYSDIR>\sicl32.dll
<WINSYSDIR>\siclut16.dll (Windows 95/98/Me)
<WINSYSDIR>\siclut17.dll (Windows 95/98/Me)
<WINSYSDIR>\siclut31.dll (Windows 95/98/Me)
<WINSYSDIR>\siclrpc.dll
<WINSYSDIR>\vbsicl32.dll
<WINSYSDIR>\visa32.dll
<WINSYSDIR>\visaext.dll
<WINSYSDIR>\vxiclass.dll (Windows 95/98/Me)

<WINSYSDIR>\wn1394.vxd (Windows 95)
<WINSYSDIR>\wnpapi32.dll (Windows 95)
<WINSYSDIR>\wnpapi32.dll (Windows NT)
<WINSYSDIR>\drivers\1394ipt.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\agt82341.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\agt82350.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\agt82357.sys (Windows 2000/XP)
<WINSYSDIR>\drivers\agte2075.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\ag074i32.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\ag341i32.sys (Windows NT/2000/XP)
<WINSYSDIR>\drivers\ag350i32.sys (Windows NT)
<WINSYSDIR>\drivers\wn1394.sys (Windows NT)

Interoperating in National Instruments VISA Systems

This section gives guidelines to install Agilent VISA as secondary (side-by-side) VISA, to configure a National Instruments (NI) GPIB card to work with Agilent VISA, or to configure an Agilent GPIB card to work with NI-VISA. This section includes:

- Installing Side-by-Side Agilent VISA
- VISA Implementation Architecture
- General Configuration Tips
- Configuring an NI GPIB Card
- Configuring an Agilent GPIB Card
- Known Problems

Installing Side-by-Side Agilent VISA

In Agilent IO Libraries version K.01.00 and later, Agilent VISA can be installed as a secondary VISA (side-by-side). If NI-VISA is installed, Agilent VISA will default to the side-by-side installation so Agilent VISA will not overwrite NI-VISA.

> **NOTE**
>
> *See "Installing a Custom Version of New Libraries" in Chapter 2 - Installing the Agilent IO Libraries for steps to install Agilent VISA as primary VISA or as secondary (side-by-side) VISA.*

VISA programs normally link to *visa32.dll* which is installed in the Windows system directory. Agilent VISA is implemented in *agvisa32.dll* which is also installed in the Windows system directory.

If Agilent VISA is installed as primary, the Agilent version of *visa32.dll* is installed in the Windows system directory. It simply forwards all VISA calls to *agvisa32.dll*.

If Agilent VISA is installed as secondary, *agvisa32.dll* is installed but Agilent's *visa32.dll* is not. Thus, it will not overwrite another vendor's *visa32.dll* which may already be installed.

If Agilent VISA is installed as secondary, the support files in the *bin*, *include* and *lib* directories of the *<VISA Framework Path>* (such as *c:\program files\visa\winnt* on Window NT/2000 or *c:\program files\visa\win95* on Windows 95/98/Me) are not installed since they would overwrite another vendor's support files.

Copies of the Agilent version of the VISA support files can be found in the *agbin*, *include* and *lib* subdirectories under *<VISA Framework Path>\agvisa*. These files are installed even when Agilent VISA is primary.

The Agilent VISA utilities **vifind32.exe** and VISA Assistant will use Agilent VISA even if another vendor's VISA is installed as primary.

A VISA program will normally use the primary VISA (call through *visa32.dll*). However, if a VISA program is linked with *agvisa32.lib* or dynamically loads *agvisa32.dll* it will use Agilent VISA even if it is not the primary VISA.

By dynamically loading both *visa32.dll* and *agvisa32.dll*, it is possible for a program to access both versions of VISA in the same program. If this is done, keep careful track of your VISA session values. Session values returned from one vendor's VISA implementation cannot be used in VISA calls to a different vendor's implementation.

VISA Implementation Architecture

Agilent can support National Instruments I/O through TULIP drivers which use NI-488 and NI-VXI library calls to communicate with NI hardware. NI-488 must be installed and the NI GPIB cards configured before they can be accessed by Agilent SICL or VISA programs. Also, NI VXI must be installed and the NI VXI interface configured before VXI devices can be accessed by Agilent SICL or VISA programs.

After installing and configuring the NI hardware and software, the Agilent IO Config program must also be used to configure the Agilent IO Libraries to recognize the NI hardware and software.

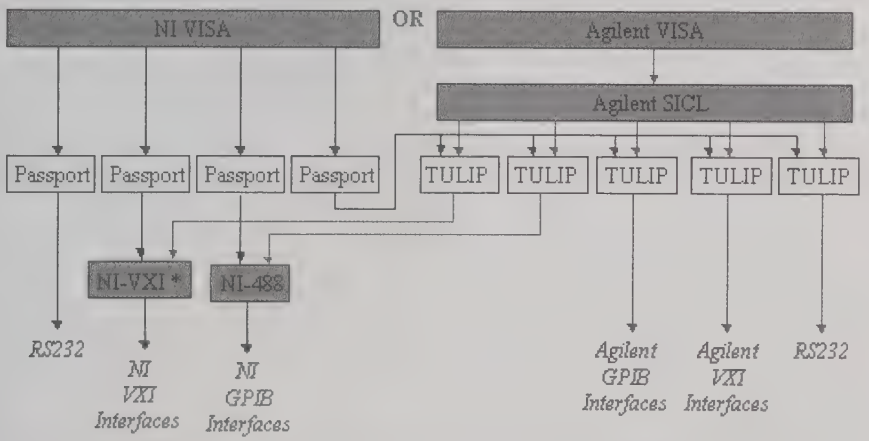
National Instruments can support Agilent IO through a 'Passport' driver under NI-VISA. They have implemented a Passport to TULIP driver which allows NI-VISA to communicate with Agilent hardware. NI-VISA can communicate with Agilent hardware using the NI Passport to TULIP driver.

Agilent hardware must be configured using the Agilent IO Config program before Agilent hardware can be accessed from NI-VISA. NI-VISA must be the primary VISA in this case. Agilent VISA can be installed as secondary (side-by-side) or only Agilent SICL may be installed.

Agilent VISA and NI-VISA cannot both be installed. Beginning with Agilent IO Libraries version K.01.00, you may, however, install Agilent VISA as

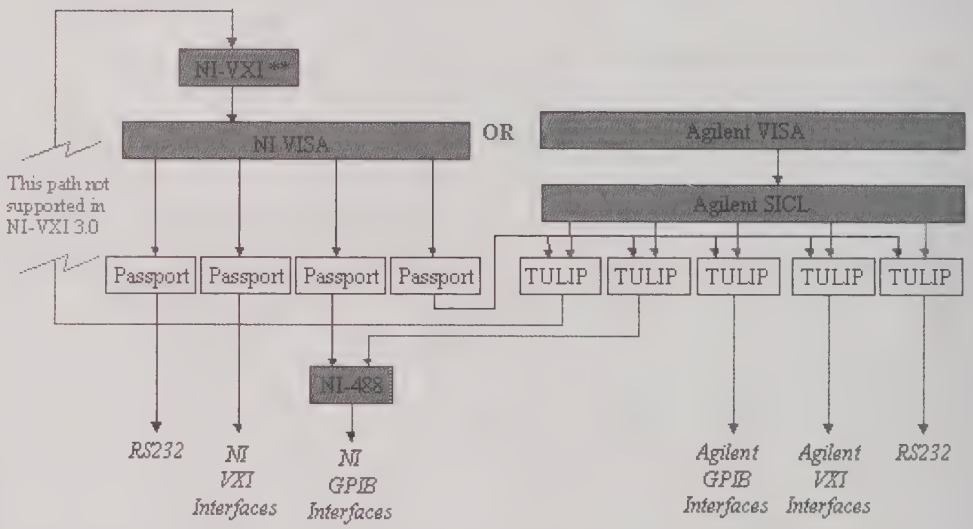
secondary (side-by-side) without overwriting NI-VISA. Normal VISA programs, in this case, will use NI-VISA unless they are specifically written to use Agilent VISA.These diagrams illustrate how Agilent and National Instruments software allow multi-vendor hardware communications.

VISA Implementation Architecture Before NI-VXI 3.0



* NI-VXI before version 3.0 was implemented as a separate library independent of NI-VISA. The Agilent NI-VXI TULIP driver calls this library to allow Agilent SICL and VISA programs to communicate with VXI devices through NI-VXI.

VISA Implementation Architecture After NI-VXI 3.0



**NI-VXI version 3.0 and later is implemented as a layer above NI-VISA and not all of the NI-VXI calls that are used by the Agilent NI-VXI TULIP driver have been implemented in this layer. This means that Agilent SICL and VISA programs do not currently work with this configuration.

General Configuration Tips

To use Agilent interfaces (configured with IO Config) from NI-VISA, you must select the **NiVisaTulip.dll-Visa Library Passport for Tulip** in *MAX / Tools / NI-VISA / Passport Editor.*

After selecting the **VISA Library Passport for Tulip** checkbox in Passport Editor and closing MAX, wait about 5 seconds before restarting MAX to allow the computer time for reconfiguration.

National Instruments defaults to a **0** address for VISA names such as VXI0 or GPIB0. The default choice in IO Config for Agilent Interfaces is also **0**, so this should be changed to a different number between 1 and 99 (such as VXI1 or GPIB1) for National Instruments to connect to both an Agilent interface (via NI-VISA Library Passport for Tulip) and an NI interface. See the "Known Problems" section for more information.

Installation of NI-VXI is not required for NI-VISA to talk to Agilent VXI interfaces via the Passport for Tulip.

If both NI-VISA and Agilent VISA are installed (via side-by-side Agilent installation), VISA applications such as VEE and LabView use the NI-VISA layer to talk to instruments. However, VISA Assistant still talks to Agilent VISA because it talks directly to a special Agilent VISA file, *agvisa32.dll*, not to the NI *visa32.dll.*

Only if the *agvisa32.dll* file is not present does VISA Assistant talk to NI's *visa32.dll* file. To test this, on a side-by-side installation run the utility **vifind32.exe** (located in *\Program Files\VISA\winnt\agvisa*) and note what interfaces and instruments are listed. Then, change the name of the *agvisa32.dll* file (in *\winnt\system32* or *\WINDOWS\SYSTEM*) to something like *agvisa32.sav*, re-run **vifind32.exe** and observe what interfaces are now listed.

In the first case, Agilent VISA names are listed as defined in IO Config. In the latter case, VISA names are listed as defined in National Instrument's configuration. Remember to rename *agvisa32.sav* back to *agvisa32.dll* when you are finished.

When Agilent Full SICL is installed after installing NI-VISA, only SICL interface names are set in IO Config, not VISA interface names. If Agilent interfaces are accessed from NI-VISA through the Passport for Tulip, NI-VISA builds a VISA name for the Agilent interface by appending the number at the end of the SICL interface name to a NI-VISA prefix. For instance, if the SICL interface name is **hpib7**, NI-VISA appends the **7** to GPIB to make a **GPIB7** VISA interface name for NI-VISA.

Even though you may not be requested to do so, it is a good idea to reboot after configuring interfaces in IO Config. This lets IO Config do a fresh read of all hardware and registry values which may have changed during or after configuring interfaces in IO Config.

You cannot install both Agilent and National Instruments VISA on the same system. The last VISA to be installed will overwrite the first VISA installation. For this reason, if NI-VISA is installed, the Agilent IO Libraries defaults to installing a side-by-side version of Agilent VISA which will not overwrite NI-VISA. You can force Agilent VISA to overwrite NI-VISA by selecting the Full SICL and Agilent VISA Installation menu choice when installing the Agilent IO Libraries.

If Agilent VISA is installed and then NI-VISA or NI-VXI is installed afterward, the *visa32.dll* file in *\Winnt\system32* (Windows NT/2000) or *\WINDOWS\SYSTEM* (Windows 95/98/Me) is still the Agilent version since NI will not overwrite it. Only one *visa32.dll* is allowed and either Agilent or NI has to be in control. To allow control to shift to NI, the IO Libraries install needs to be modified before installing NI-VISA or NI-VXI:

1. In Control Panel, run **Add/Remove Programs**
2. Select **Agilent IO Libraries** and **Add/Remove (NT 4.0) or Change/Remove (Win2K)**.
3. The InstallShield Wizard will run and offer one of three choices. Select **Modify** and press **Next>**. The Agilent IO Libraries components will be listed.
4. De-select the checkbox **Make Agilent VISA Primary** and click **Next>**. The registry will be updated and you are next given a choice to configure the interfaces. Since no real interfaces have changed, make sure **Do not configure interfaces** now is selected.
5. Click **Next>** and **Finish**.

The result of these steps will be to remove Agilent's *visa32.dll* from the *\Winnt\system32* or *\WINDOWS\SYSTEM* directory so that when NI-VISA or NI-VXI is installed, NI's version of the *visa32.dll* file will be installed. To check which *visa32.dll* file is installed, in Windows Explorer right-click on the *visa32.dll* file and select **Properties**. Click the **Version** tab to see if the file is Agilent's or National Instrument's.

Agilent VISA can be installed after NI-VXI or NI-VISA. The Agilent IO Libraries installation checks whether NI-VISA is present and selects the best-guess default installation mode for the user.

- If no NI-VISA is detected, the default is **Full install with Agilent VISA as primary**.
- If NI-VISA is detected, the default is **Full install with Agilent VISA as secondary**.

If there is a selection mode available for Plug and Play in the system BIOS, make sure the selection is set to **NO** or **OFF** for Windows NT 4.0 and **YES** or **ON** for Windows 2000. In Windows 2000, **Resman** (NI's Resource Manager application program) sometimes has trouble finding an NI-VXI interface properly if NI-VXI is installed after side-by-side Agilent VISA.

The default proper order of installation is the same for both Agilent and National Instruments on both Windows NT 4.0 and Windows 2000: first, install the software and then install the hardware.

The architecture of NI-VXI versions 3.0 or newer is different than NI-VXI versions 2.X and older. The latest NI-VXI is a software layer installed on top of NI-VISA, whereas it used to be below the passport layer. NI-VXI 3.0 and newer connects to NI-VXI hardware through the NI-VISA and the VXI Passport layers.

For NI-VXI to work, the NI-VISA (version 2.5 or newer) layer must be present. Agilent VISA cannot connect to NI-VXI interfaces because once NI-VISA is installed, Agilent VISA cannot be primary. Communication with NI-VXI MXI or 1394 interfaces should be accomplished using NI-VISA. Also, at this time, SICL is not supported on NI-VXI version 3.0 or newer.

Therefore, NI-VXI versions before 3.0 and NI-VISA versions before 2.5 must be used when accessing NI-VXI devices with the Agilent E9850 and E9851 embedded controller. On the other hand, NI-VXI 3.0 CAN talk to either NI-VXI or Agilent VXI interfaces, since the Agilent VXI tulip driver resides in a software layer below Agilent SICL. The NI Passport for Tulip then uses the Agilent VXI tulip to interface to VXI hardware.

NOTE

MAX and VISAIC are installed with NI-VISA. This software is only available from National Instruments. Agilent does not ship this software.

Configuring an NI GPIB Card

This section shows how to configure a National Instruments GPIB card to work with the Agilent IO Libraries. To use an NI GPIB card with the Agilent IO Libraries:

1. Install the NI-488.2 software (version 1.5 or later) according to the instructions supplied with the NI card and the NI software.
2. Install and configure the NI-GPIB card in your computer.
3. Install the Agilent IO Libraries (version J.01.00 or later).
4. Run the Agilent IO Config program and configure the GPIB Using NI-488.2 interface(s).
5. If GPIB Using NI-488.2 is not listed in the **Available Interface Types** in IO Config, you must create and/or edit the *intfcfg.ini* file to make it available. See Step 7. Otherwise, skip Step 7.
6. If you are using NI-VISA and have enabled the VISA Library Passport for Tulip, be sure to see the "Known Problems" section.
7. This step shows how to create and edit the *intfcfg.ini* file to force Agilent IO Config to recognize the presence of an NI-GPIB card. If IO Config did not detect the presence of a configured NI-488 GPIB interface, you can override the default search algorithm and directly specify the configured NI-488 GPIB interfaces by creating and editing the *intfcfg.ini* file so that IO Config can configure them.
   a. **Creating intfcfg.ini:** The *intfcfg.ini* file must be created. It is not installed by the Agilent IO Libraries installer. If you have not previously created *intfcfg.ini,* you can create it by copying the sample *intfcfg.txt* file to *intfcfg.ini.* The *intfcfg.txt* file is located in the *intfcfg* subdirectory under the Agilent IO Libraries installation directory *C:\Program Files\Agilent\IO Libraries\intfcfg\ intfcfg.txt* (if you installed in the default location).

NOTE

If you are using Windows Explorer to create intfcfg.ini, make sure that 'Hide File Extensions' is not set. If it is set, you will really be creating intfcfg.ini.txt, which will not work.

b Editing intfcfg.ini:

1 Locate the [CfgNi488] section in the *intfcfg.ini* file.

2 'Uncomment' (by removing the leading semicolon) the appropriate **GPIBn=yes** line to force IO Config to recognize the NI-488 GPIB interface. Uncomment only the lines for which you have a configured NI-488 GPIB interface.

3 Save the modified *intfcfg.ini* file.

4 You can now run IO Config to configure the interface(s).

Configuring an Agilent GPIB Card

This section shows how to configure an Agilent GPIB card for use with National Instruments VISA. To use an Agilent GPIB card with NI-VISA, do the following (and be sure to reboot when prompted):

1 Install NI-VISA (version 2.5 or later).

2 Install the Agilent GPIB card in your computer.

3 Install the Agilent IO Libraries (J.01.00 or later) and choose the **Full install with Agilent VISA as secondary** or the **Runtime install with Agilent VISA as secondary** option.

4 Configure the Agilent hardware using the Agilent IO Config program.

5 Run NI's Measurement and Automation Explorer program (MAX) and use the menu to navigate to **Tools | NI-VISA | Passport Editor**.

6 Verify that the box for **NIVisaTulip.dll - VISA Library Passport for Tulip** is checked. This box is not checked by default. Then, close MAX.

7 The Agilent GPIB card should now be accessible from NI-VISA. It should be visible using the **NI-VISA Interactive Control** (VISAIC) program.

8 View the "Known Problems" section for information on how to correct a problem that may prevent NI-VISA from finding the GPIB interface.

Known Problems

When using an NI-GPIB card with the Agilent IO Libraries, it is possible to miss interrupts. This is because NI-488 architecture requires polling in the interrupt thread of the NI-488 to Agilent IO Libraries driver. Interrupts are polled approximately every 30 milliseconds, so if the interrupt condition lasts for less than that time, it is likely that the interrupt will not be detected.

In NI-VISA version 2.5, Agilent GPIB cards do not show up in the **Measurement and Automation Explorer (MAX)** program. MAX may GPF if VISA Library Passport for Tulip is enabled and there is an NI-488 GPIB card configured by Agilent IO Config. This can happen even if there is no name collision as described below.

In NI-VISA version 2.5, NI-VISA will not be able to find the GPIB interface if the following conditions are true:

- An NI-488 GPIB card is configured by Agilent IO Config
- NI-VISA is installed
- **VISA Library Passport for Tulip** is enabled in NI-VISA
- There is name collision between the interface names in NI-VISA and Agilent SICL. See the following text for a description of how to identify and correct this problem.

Preventing a naming conflict in NI-VISA (version 2.5). For Agilent GPIB cards, NI-VISA will assign an Agilent GPIB card a VISA interface name of GPIB*n* where *n* is:

- The number of the Agilent VISA name for the card (if Agilent VISA is installed) or
- The trailing number of the SICL name assigned by the Agilent IO Config program (for example, **hpib7** in SICL will translate to **GPIB7** in NI-VISA.) or
- The logical unit number assigned by the Agilent IO Config program if the SICL name does not have a trailing number.

If Agilent VISA has configured an NI-488 GPIB card, it will normally default the SICL name to **gpib0**. The VISA Library Passport for Tulip will then map this back to NI-VISA as **GPIB0**. This will conflict with the GPIB0 that is already mapped to the NI-488 GPIB card in NI-VISA. This conflict will cause NI-VISA to not recognize the GPIB interface.

The workaround for this problem is to run Agilent IO Config and edit the SICL name for this card to something else to prevent the conflict (such as **gpib10**). This will then, for this example, map to **GPIB10** in NI-VISA and not cause a conflict with GPIB0.

Although the GPIB10 interface is accessible from NI-VISA, it points indirectly (through Agilent SICL) to the same hardware as **GPIB0**. For this reason, your VISA programs should use **GPIB0** and not **GPIB10**.

If you initially installed Agilent SICL and did not experience a naming conflict and then later upgrade to Agilent VISA (side-by-side), you may find a conflict will exist because by installing Agilent VISA, an Agilent VISA name is defined and the interface number used by NI-VISA will change. In this case, you can edit the Agilent VISA name in IO Config to avoid the conflict.

The Agilent IO Libraries H.01.03, J.01.00 and J.02.00 releases will attempt to update the National Instruments *nivxint.dll* in the *windows\system32* directory. The version checking does not always correctly determine when the update is not needed.

A newer version of *nivxint.dll* will sometimes be replaced an older one and cause NI-VXI to stop working. If this occurs, you should delete *nivxint.dll* after you have installed the Agilent IO Libraries and then re-install NI-VXI to replace it with the correct one. Beginning in the K.01.00 release of the Agilent IO Libraries, *nivxint.dll* is not updated so this problem will not occur.

Application Notes

This section provides some application notes for the Agilent IO Libraries, including:

- Overriding Default IO Configuration
- Using VISA and SICL in the Same Application
- Using the IO Config Options Menu
- Using the Windows Registry
- Using Device Symbolic Names in SICL
- Locking with viLock
- 82350 Read/Write Performance Tuning
- VXI Signal Register 0xFDxx Interrupt
- ASCII Table for GPIB

Overriding Default IO Configuration

You can override the default behavior of IO Config on certain interfaces by using the *intfcfg.ini* file. When you install the IO Libraries, an *intfcfg.txt* file is places in the *Program Files\Agilent\IO Libraries\intfcfg* directory, assuming you have installed the Agilent IO Libraries in the default location. This file is a template for *intfcfg.ini*. The comments in this file describe the specifics of how you can create and edit *intfcfg.ini*. Some of the interfaces that can be affected by *intfcfg.ini* are:

- [Cfg232] - Allow configuration of COM ports which IO Config may not be able to recognize.
- [Cfg8234x] - Prevent lockups on some systems when IO Config scans for cards.
- [Cfg82357] - Suppress the popup menu when an 82357 is connected to the computer.
- [CfgNi488] - Tell IO Config about the presence of an NI-488 interface that it did not detect automatically.

Using VISA and SICL in the Same Application

Agilent Technologies' implementation of VISA uses SICL internally to do instrument I/O. While Agilent does not officially support the use of both SICL and VISA in a single application. you may be able to use SICL and VISA together successfully if you avoid these problem areas:

- **Do not use both VISA and SICL to talk to the same device.** If VISA and SICL are used to talk to the same device. VISA can lose track of the state of the device and communications errors may occur.
- **Do not mix SICL ilock() and VISA viLock() in versions before L.02.00.** Do not mix SICL **`ilock()`** and VISA **`viLock()`** calls on the same device and do not **`ilock()`** an interface used by VISA:
  - If a user calls VISA **`viLock()`** to lock a device. that device can still be accessed via SICL sessions.
  - If a user calls SICL **`ilock()`** and then VISA **`viLock()`** on the same device, the **`viLock()`** call will succeed, but subsequent VISA calls to that device may return a **`VI_ERROR_SYSTEM_ERROR`**.
- **viLock() Changes in version L.02.00 and Later.** In versions L.02.00 and later. VISA uses the underlying SICL locking mechanism for exclusive device locks on INSTR devices. so you can mix SICL device **`ilock()`** calls and VISA **`viLock()`** calls on INSTR devices.
  - Be careful when using SICL interface locks since an interface lock will preempt a device lock.
  - VISA **`viLock()`** uses only device locks.
- **Do not intermix iwaithdlr() and viEnableEvent() calls.** Calling **`iwaithdlr()`** in one thread and **`viEnableEvent()`** in another can cause loss of interrupts. This is because the **`viEnableEvent()`** code needs to have SICL interrupts disabled for a critical_section of code. **`iwaithdlr()`** will re-enable them and potentially cause a lost interrupts. The SICL **`iwaithdlr()`** call will terminate when a VISA interrupt occurs.

- **Do not close the last VISA resource manager session until all open SICL sessions have been closed. (Windows 95/98 ONLY).** VISA, when closing the last Default Resource Manager session, will call **`_siclcleanup()`** which closes all open SICL sessions, whether or not they were opened via VISA or directly from SICL. Any open SICL sessions will be invalid after the **`_siclcleanup()`** call.

Using the IO Config Options Menu

When the IO Config main screen is displayed, the Options menu selections are VISA Logging and Default VISA LockWait.

VISA Logging. The options for VISA Logging are **Off**, **Event Viewer**, and **Debug Window**.

- **Off (Default)**.
- **Event Viewer.** (Windows NT/2000/XP) logs to Windows NT/2000/XP's Event Viewer or Message Viewer (Windows 95/98/Me) logs to the Message Viewer application.
- **Debug Window.** logs messages using Windows **OutputDebugString()**. (This is useful in debuggers.)

Default VISA LockWait. The options are **False** (Default) and **True**. When a lock-abiding VISA call is made on a session to an exclusively locked resource:

- If **`VI_AGATTR_LOCKWAIT`** is **`VI_FALSE`**, the call will immediately return with **`VI_ERROR_RSRC_LOCKED`**.
- If **`VI_AGATTR_LOCKWAIT`** is **`VI_TRUE`**, the call will wait the session timeout interval for the lock to be released and then return **`VI_ERROR_TMO`** rather than **`VI_ERROR_RSRC_LOCKED`**.

Using the Windows Registry

New installations of the Agilent IO Libraries will create and use the registry path *HKEY_LOCAL_MACHINE\Software\Agilent\IO Libraries*. Earlier versions of the HP I/O Libraries used the registry path *HKEY_LOCAL_MACHINE\Software\Hewlett-Packard\SICL*.

To maintain backward compatibility, if there is no existing *Agilent\IO Libraries* registry path and there is an existing *Hewlett-Packard\SICL* path, the Agilent IO Libraries will continue to use the *Hewlett-Packard\SICL* path.

For new installations (where neither the Hewlett-Packard nor the Agilent path exist), you can force Agilent IO Libraries setup to create and use the *Hewlett-Packard\SICL* path by running the setup program with the parameter **usehpreg**. (such as **Setup usehpreg**). However, setup will not allow you to install using the Hewlett-Packard path if an Agilent path exists.

If both an *Agilent\IO Libraries* and a *Hewlett-Packard\SICL* path exist, Agilent IO Libraries will use the Agilent path and ignore the Hewlett-Packard path. Agilent IO Libraries setup will not normally create a second registry path if one already exists.

However, if you install an older version of the Agilent IO Libraries over a version which has created an Agilent path or another application has created the Hewlett-Packard path, it is then possible for both paths to exist.

If you want to change the registry path used by the Agilent IO Libraries, you must first uninstall the currently installed Agilent IO Libraries to remove the old path and then re-install the Agilent IO libraries using the appropriate setup option to use the new path.

You can determine which registry path the Agilent IO Libraries are using by clicking the **Agilent IO Libraries Control** and selecting the **View Documentation** | **Installation and Path Information** menu.

Using Device Symbolic Names in SICL

SICL supports device symbolic names. You can assign a symbolic name to a device and then use that name in place of the device's address when making an `iopen()` call. The advantage of doing this is that you do not have to hardcode device addresses in your programs.

Device symbolic names can be defined by editing the registry.

1. Run the **Regedit** utility. Select **HKEY_LOCAL_MACHINE**, **Software**, **Agilent**, **IO Libraries**, **CurrentVersion.** If you have upgraded from an earlier version, **regedit** may be located at **HKEY_LOCAL_MACHINE**, **Software**, **Hewlett-Packard**, **SICL**, **CurrentVersion**.

2. Under **CurrentVersion**, add a new key called **Devices**. Do this by selecting **Edit** then **New** then **Key** from the registry entry's menu.

3. For each symbolic name you want to define, add a new string value in the **Devices** key. Do this by highlighting the **Devices** entry and then selecting **Edit**, then **New**, then **String Value** from the menu.

4 Enter the symbolic name in the name field. Edit the value by double-clicking the name field. Enter the value without quote marks.

5 For example, the following **Devices** entries would result in two device symbolic names being defined, where **dmm** refers to a device at **gpib0,0** and **scope** refers to a device at **gpib0,9**.

Name	Data
dmm	"gpib0,0"
scope	"gpib0,9"

After adding these entries to the registry, a program could open sessions to the two devices by using `iopen("dmm")` and `iopen("scope")` instead of `iopen("gpib0,0")` and `iopen("gpib0,9")`. If the address to either device changed, you could edit the registry and change the address there instead of modifying your program.

Locking with viLock

An Agilent-specific VISA ViBoolean local (per-session) attribute, `VI_AGATTR_LOCKWAIT`, as been created. When a lock-abiding VISA call is made on a session to an exclusively locked resource:

- If `VI_AGATTR_LOCKWAIT` is `VI_FALSE`, the call will immediately return with `VI_ERROR_RSRC_LOCKED`.
- If `VI_AGATTR_LOCKWAIT` is `VI_TRUE`, the call will wait the session timeout interval for the lock to be released and then return `VI_ERROR_TMO` rather than `VI_ERROR_RSRC_LOCKED`.

The default value for `VI_AGATTR_LOCKWAIT` is normally `VI_FALSE`, but this default can be changed from the Agilent IO Libraries Control (**Agilent VISA Options** | **Default VISA LockWait** menu) or from IO Config (**Options** | **Default VISA LockWait** menu).

On VISA INSTR resources (and only on INSTR resources), the `viLock` function with `VI_EXCLUSIVE_LOCK` now obtains an underlying SICL lock as well. This has several implications:

- Exclusive VISA locks now work across a LAN. (Shared VISA locks are still local to the the computer on which `viLock` is executed.) This is because the VXI-11 LAN protocol and the SICL-LAN protocol which are used by VISA do not support shared locks.

- If SICL and VISA are used in the same program, VISA will obey SICL locks and SICL will obey exclusive VISA locks.
- In IO Config, a GPIB interface that has the **Identify devices at run-time** box checked in the **Edit VISA Config...** dialog box may cause VISA calls to devices on the same interface to return a **`VI_ERROR_RSRC_LOCKED`** error when another process calls **`viFindRsrc`** or **`viFindNext`**, even though no VISA function has locked the interface.

  This occurs because VISA itself will momentarily preempt the device lock and lock the entire interface when it scans for devices. You can avoid this problem by using one of the following methods.

  - Pre-configure all your GPIB devices using the **Add Device** or **Auto Add devices** and make sure the **Identify devices at run-time** box is not checked.
  - After you **`viOpen`** a GPIB session, call **`viSetAttribute(vi, VI_AGATTR_LOCKWAIT, VI_TRUE`**) so rather than immediately returning a **`VI_ERROR_RSRC_LOCKED`** error, the function will wait the session timeout value for the device to become available.

    If it does not become available, a **`VI_ERROR_TMO`** will be returned. The time needed for **`viFindRsrc`** is usually less than the 2 second default VISA timeout value.
  - Set the default VISA lockwait value to **`VI_TRUE`** so all VISA INSTR sessions will wait the timeout value rather than returning **`VI_ERROR_RSRC_LOCKED`**. You can use this method on existing programs that you do not want to modify by adding the **`viSetAttribute`** call described above.

82350 Read/Write Performance Tuning

The 82350 card read and write calls use one of two modes:

- **Polling.** Bytes are transferred to/from the card, one at a time. Polling mode is advantageous for transferring a small number of bytes because the setup overhead is very low, but it does requires CPU involvement for each byte transferred.
- **Interrupt.** An entire buffer is transferred to/from the card without CPU involvement. Interrupt mode is advantageous for transferring large buffers because the higher per byte transfer rate more than compensates for the relatively long interrupt setup overhead.

The default behavior of the 82350 driver is to use **Polling** mode for transfers of 256 bytes or less and to use **Interrupt** mode for larger transfers. You can modify this default behavior by doing the following:

SICL: The SICL `ihint(id, hint)` function can be called to modify the read/write behavior for on a SICL session. The `hint` values allowed are:

- `I_HINT_DONTCARE` (default value) Use Interrupt mode for transfer requests larger than 256 bytes, otherwise, use Polling mode.
- `I_HINT_USEPOLL` Use the Polling mode.
- `I_HINT_USEDMA`
- `I_HINT_USEINTR`
- `I_HINT_SYSTEM`
- `I_HINT_IO` Use the Interrupt mode.

VISA: The VISA `viSetAttribute(vi, VI_ATTR_DMA_ALLOW_EN, attrValue)` function can be called to modify the read/write behavior for a VISA session. The `VI_ATTR_DMA_ALLOW_EN` values allowed are:

- `VI_TRUE` (default value) Use Interrupt mode for transfer requests larger than 256 bytes, otherwise, use Polling mode.
- `VI_FALSE` Use the Polling mode.

Some additional factors to consider are:

- The settings discussed above are per session. This means you can open multiple sessions to a device and set different transfer modes for different sessions. The actual mode used will then depend on which session you are using for the read/write calls.

- In both SICL (with **hint = I_HINT_DONTCARE**) and VISA (with **VI_ATTR_DMA_ALLOW_EN = VI_TRUE**), the size of the read request (as specified by **bufsize** in a SICL **iread()** or **count** in a VISA **viRead()** function call) will determine the mode used even if the number of bytes actually read is less.
- The default formatted IO read buffer size is 4096 so when using this default size, formatted reads in SICL (with **hint = I_HINT_DONTCARE**) and VISA (with **VI_ATTR_DMA_ALLOW_EN = VI_TRUE**) will use Interrupt mode even when a small number of bytes are expected.
- The default formatted IO write buffer size is 128 so when using this default size, formatted writes in SICL (with **hint = I_HINT_DONTCARE**) and VISA (with **VI_ATTR_DMA_ALLOW_EN = VI_TRUE**) will used Polling mode even when a large number of bytes are being sent.
- In SICL, Polling mode will always be used for the **iread()**, **ifread()** and **iscanf()** regardless of the above settings, when a **termchr** is set (**itermchr()** is not set to **-1**).
- In VISA, Polling mode will always be used for **viRead()**, **viBufRead()** and **viScanf()** regardless of the above settings, when **VI_ATTR_TERM_CHAR_EN = VI_TRUE**.
- The crossover point (the number of bytes transferred at which Interrupt mode becomes faster than Polling mode) depends on the CPU speed, with a faster the CPU having a higher crossover point.

VXI Signal Register 0xFDxx Interrupt

Both SICL and VISA can be enabled to receive signals and interrupts from a VXI device. When a VXI signal/interrupt is received, the status ID of the signal is a 16-bit word. The upper 8 bits indicate the nature of the signal and the lower 8 bits contain the VXI logical address of the interrupter.

The 0xFDxx response (VXI **Request True**) indicates the VXI device is requesting service and it is treated as a special case in SICL and Agilent VISA. When this response is detected, the following will occur:

SICL: Interrupt enabled Handlers Called

- **`SRQ`** SRQ handler
- **`I_INTR_VXI_SIGNAL`** none

Agilent VISA: Interrupts enabled Events Generated

- **`VI_EVENT_SERVICE_REQ`** **`VI_EVENT_SERVICE_REQ`**
- **`VI_EVENT_SERVICE_REQ`** and **`VI_EVENT_VXI_SIGP`**
- **`VI_EVENT_SERVICE_REQ`** and **`VI_EVENT_VXI_SIGP`**
- **`VI_EVENT_VXI_SIGP`** none

ASCII Table for GPIB

The following table gives the full standard 7-bit ASCII character set and the values of each character in decimal (D), hexadecimal (H), and octal (0), along with the corresponding GPIB address or command byte (if one exists). LAD0-LAD30 is abbreviated to L0-L30 and TAD0-TAD30 is abbreviated to T0-T30. The secondary command bytes (secondary addresses and the PPE/PPD commands) are listed in the right-hand column as SC0-SC31.

ch	ctl	cmd	D	H	O	ch	cmd	D	H	O	ch	cmd	D	H	O	ch	cmd	D	H	O
NUL	^@		0	0	0	sp	L0	32	20	40	@	T0	64	40	100	'	SC0	96	60	140
SOH	^A	GTL	1	1	1	!	L1	33	21	41	A	T1	65	41	101	a	SC1	97	61	141
STX	^B		2	2	2	"	L2	34	22	42	B	T2	66	42	102	b	SC2	98	62	142
ETX	^C		3	3	3	#	L3	35	23	43	C	T3	67	43	103	c	SC3	99	63	143
EOT	^D	SDC	4	4	4	$	L4	36	24	44	D	T4	68	44	104	d	SC4	100	64	144
ENQ	^E	PPC	5	5	5	%	L5	37	25	45	E	T5	69	45	105	e	SC5	101	65	145
ACK	^F		6	6	6	&	L6	38	26	46	F	T6	70	46	106	f	SC6	102	66	146
BEL	^G		7	7	7	`	L7	39	27	47	G	T7	71	47	107	g	SC7	103	67	147
BS	^H	GET	8	8	10	(	L8	40	28	50	H	T8	72	48	110	h	SC8	104	68	150
HT	^I	TCT	9	9	11	)	L9	41	29	51	I	T9	73	49	111	i	SC9	105	69	151
LF	^J		10	a	12	*	L10	42	2a	52	J	T10	74	4a	112	j	SC10	106	6a	152
VT	^K		11	b	13	+	L11	43	2b	53	K	T11	75	4b	113	k	SC11	107	6b	153
FF	^L		12	c	14	,	L12	44	2c	54	L	T12	76	4c	114	l	SC12	108	6c	154
CR	^M		13	d	15	-	L13	45	2d	55	M	T13	77	4d	115	m	SC13	109	6d	155
SO	^N		14	e	16	.	L14	46	2e	56	N	T14	78	4e	116	n	SC14	110	6e	156
SI	^O		15	f	17	/	L15	47	2f	57	O	T15	79	4f	117	o	SC15	111	6f	157
DLE	^P		16	10	20	0	L16	48	30	60	P	T16	80	50	120	p	SC16	112	70	160
DC1	^Q	LLO	17	11	21	1	L17	49	31	61	Q	T17	81	51	121	q	SC17	113	71	161
DC2	^R		18	12	22	2	L18	50	32	62	R	T18	82	52	122	r	SC18	114	72	162
DC3	^S		19	13	23	3	L19	51	33	63	S	T19	83	53	123	s	SC19	115	73	163
DC4	^T	DCL	20	14	24	4	L20	52	34	64	T	T20	84	54	124	t	SC20	116	74	164
NAK	^U	PPU	21	15	25	5	L21	53	35	65	U	T21	85	55	125	u	SC21	117	75	165
SYN	^V		22	16	26	6	L22	54	36	66	V	T22	86	56	126	v	SC22	118	76	166
ETB	^W		23	17	27	7	L23	55	37	67	W	T23	87	57	127	w	SC23	119	77	167
CAN	^X	SPE	24	18	30	8	L24	56	38	70	X	T24	88	58	130	x	SC24	120	78	170
EM	^Y	SPD	25	19	31	9	L25	57	39	71	Y	T25	89	59	131	y	SC25	121	79	171
SUB	^Z		26	1a	32	:	L26	58	3a	72	Z	T26	90	5a	132	z	SC26	122	7a	172
ESC	^[		27	1b	33	;	L27	59	3b	73	[	T27	91	5b	133	{	SC27	123	7b	173
FS	^\		28	1c	34	<	L28	60	3c	74	\	T28	92	5c	134		SC28	124	7c	174
GS	^]		29	1d	35	=	L29	61	3d	75	]	T29	93	5d	135	}	SC29	125	7d	175
RS	^^		30	1e	36	>	L30	62	3e	76	^	T30	94	5e	136	~	SC30	126	7e	176
US	^_		31	1f	37	?	UNL	63	3f	77	_	UNT	95	5f	137	DEL	SC31	127	7f	177

GTL	Go To Local.	PPU	Parallel Poll Unconfigure.
SDC	Selected Device Clear.	SPE	Serial Poll Enable.
PPC	Parallel Poll Configure.	SPD	Serial Poll Disable.
GET	Group Execute Trigger.	L0-L30	Listen addresses (32+ADDR).
TCT	Take Control.	UNL	Unlisten (= L31).
GTL	Go To Local.	T0-T30	Talk addresses (64+ADDR).
LLO	Local Lockout.	UNT	Untalk (= T31).
DCL	Device Clear.	SC0-SC31	Secondary commands (96+ADDR).

Troubleshooting Guidelines

This section provides some troubleshooting guidelines for the following I/O interfaces:

- GPIB Interface Devices Troubleshooting
- GPIB (82350) Interface Troubleshooting
- VXI (E8491) Troubleshooting
- USB/GPIB (82357) Troubleshooting
- LAN/GPIB (E5810/E2050) Troubleshooting

GPIB Interface Devices Troubleshooting

Sound Card Does Not Work

If your sound card stops working after configuring interfaces, disable the auto-detection process in IO Config. The auto-detection process in IO Config can cause sound and other cards to stop responding. To disable the auto-detection process, edit *c:\Program Files\agilent\IO Libraries\intfcfg\intfcfg.txt* and follow the instructions to set all GPIB cards to be manually detected by IO Config.

Data Transfers to Devices Fail

If devices attached to your ISA (82341) GPIB card are detected, but data transfers to those devices fail, this is usually caused either by an IRQ conflict with another card or by your system having no IRQ's available for this card. If no IRQ's are available, the IRQ value shown in IO Config will be -1.

For Windows NT/2000/XP: Try changing the IRQ setting to other values. You must reboot after changing the value to test it. If none work, you will have to free up other IRQs by disabling devices such as serial ports or sound cards.

For Windows 95/98/Me: You will have to free up other IRQs by disabling devices such as serial ports or sound cards. This is usually done in the BIOS setup for your computer.

GPIB (82350) Interface Troubleshooting

If IO Config reports finding an 82350 card with serial number ffffffff, this is typically caused by getting into a situation where PCI cards are not properly configuring. Try the following:

1. **Check BIOS Setting.** For Windows NT, make sure the BIOS **Operating System** setting is set to **Not PnP OS** or to **Running Windows NT** or to **Other.** It should not be set to **Running Windows 95**, **Running Windows 98**, **Running Windows 2000**, or **PnP O/S**

2. **Upgrade your system BIOS to the latest version.** Note that even brand new computers tend to have new BIOSs available.

3. **If your computer locks up or freezes after installing.** What we're seeing is mostly interrupt conflicts with other drivers in the system. PCI allows sharing of IRQs, but this also means that the drivers for cards with which we are sharing an IRQ must be handling interrupt chaining properly.

   Both NT and Windows 9x allow multiple drivers to install interrupt service routines (ISRs) for a single IRQ. The OS will keep a list of all the ISRs installed for each IRQ. When the IRQ is asserted, the OS will call each ISR in turn until one of them returns TRUE (meaning that it handled the interrupt). The ISR's responsibility is to correctly return TRUE if its device was interrupting, or FALSE if not.

4. **Perform Driver Work-Arounds.** Here are some ways to work around drivers that are not behaving properly:

   a. Upgrade the drivers for devices sharing an IRQ with Agilent, including but not limited to, your video drivers, your LAN drivers, Agilent IDE and/or SCSI drivers, and your sound drivers

   b. Try to force the Agilent driver to be installed earlier in the ISR chain

   c. For Windows NT, Click **Control Panel | Devices**. Select the **HP350i32**. Select **Startup...** and set to **System** instead of the default **Automatic**. (Running IO Config will set this back to **Automatic**.)

   d. For Windows 9x, change your BIOS **Installed OS** setting. Try all the different values and use the one that works.

e For Windows 9x, make sure all devices sharing an IRQ with our card have drivers installed. Right-click **My Computer** and select **Properties**, then **Device Manager**. Highlight **Computer** and click **Properties**. Find the 82350 card and check that all other cards on the same IRQ have a valid driver, not the big yellow question-mark.

5 **Re-Configure Your PC.** Configure your PC so as to not share IRQ lines. Many PCI cards have bugs when sharing IRQ lines. You may or may not be able to do this on all PCs. Many PCs can be configured using the setup option when the PC is first booting.

6 **Upgrade your system BIOS.** Note that even new computers may have a newer BIOS available.

a Make sure the BIOS **Installed O/S** setting is set correctly. This determines what software will configure all the VXI*plug&play* cards in your system. Either the BIOS or the O/S can perform the task of querying all the cards to determine their resource needs, picking a valid configuration for all these cards, and telling the cards what their actual resource settings are.

b If the BIOS **Installed O/S** is set to **Windows 95**, **Windows 98**, **Windows 2000** or **Running a PnP O/S**, the BIOS will not perform this task and will leave it to the O/S to do this. If the **Installed O/S** is set to **Windows NT**, **NOT PnP O/S**, or **Other**, the BIOS will perform this task.

c For NT version 4.0 or earlier, the BIOS must perform this task as the O/S does not know how to do this. For Windows 9x, either the BIOS or the O/S can do this task, so try both. If you are running Windows 95, try all combinations of settings. If you are running Windows NT, set to **Running Windows NT**, **Not VXI*plug&play* OS** or **Other**.

VXI (E8491) Interface Troubleshooting

This section gives guidelines to troubleshoot the VXI (E8491) interface, including:

- Known Windows Problems
- Certain Topologies May Not Work
- IO Config Cannot Find Your E8491
- PC Locks up After Installation
- Using the E8491 With a Laptop PC

Known Windows Problems

There are some known Windows 98/Me/2000 IEEE-1394 problems which may affect the E8491.

- Block write and I-SCPI performance on the E8491 on Windows 2000 are significantly reduced due to the workaround for a memory leak in the IEEE-1394 driver.
- Performance problems and missed interrupts on Windows 98/Me/2000 are possible due to a busy-acknowledge defect in the IEEE-1394 driver. This is known to affect some E8491 firmware downloads and some I-SCPI and VXI*plug&play* drivers.

NOTE

Microsoft has implemented a hotfix that should solve these problems. You can find out more about this hotfix at `www.microsoft.com`. *Search for Q262814 (for Windows 2000) or search for Q252183 (for Windows 98/Me) to find the Knowledge Base information on obtaining the hotfix . If you have difficulty, contact Agilent for more information.*

The hotfix must be obtained from Microsoft. Microsoft does not allow Agilent to distribute Windows hotfixes. Microsoft has stated that fixes for Windows 2000 will be included in the Windows 2000 Service Pack 2 when it becomes available. The E8491 driver will sense the presence of the hotfix or Service Pack 2 and automatically switch to a higher performance mode if either is installed.

Certain Topologies May Not Work

When three or more E8491s are connected to a single IEEE-1394 interface card, certain topologies may not work. In certain topologies, the E8491 hardware is not properly identified on the IEEE-1394 bus. This may result in inconsistent behavior when the VXI resource manager tries to configure instruments in VXI mainframes.

Behavior may include timeout errors while attempting to communicate with a particular instrument and/or instruments appearing in mainframes where they are not actually located.

To eliminate this problem, try reversing the cable connections to the ports on the host interface card. In general, cable connections with longer chains of E8491s should be on lower host ports. If the E8491 is very busy and an IEEE-1394 bus reset occurs, it may become unresponsive and require a reset of the E8491 and/or a reboot of the computer. This problem can occur when another IEEE-1394 device is added or removed while the E8491 is busy.

IO Config Cannot Find Your E8491

If IO Config cannot find your E8491, first make sure all your VXI mainframes are powered on and your IEEE-1394 cables are connected to both the Host Adapter and to the E8491 before running IO Config, since IO Config will only search for new interfaces when it starts up. Then, take the applicable steps for your operating system.

Windows 98

1. Install the driver for the OHCI-compliant IEEE-1394 Host Controller using the *Windows 98* CD that came with your computer.
2. After installing the driver, reboot to make sure the driver is working properly so the system will be able to find the E8491 card.
3. Launch the Windows Device Manager by clicking **Start** | **Settings** | **Control Panel** | **System**. Choose the **Device Manager** tab.
4. Look under **Other Devices** for the **Hewlett-Packard HP8491A.**
5. Right-click the **Hewlett-Packard HP8491A** and choose **Properties**.
6. Click the **Reinstall Driver** button to bring up the **Update Device Driver Wizard** and reinstall the driver using the *Agilent IO Libraries for Instrument Control* CD and specifying the *\Windows 2000* directory as the location of the driver files.

7 When you are finished, you should see an **Agilent E8491 1394 VXI controller** listed under **Test & Measurement devices.** At this point, IO Config should be able to find the E8491.

Windows 2000

1 Launch the Windows Device Manager by clicking **Start** I **Settings** I **Control Panel** I **System**. Choose the **Hardware, Device Manager** tab.

2 Look under **Other Devices** for a **Hewlett-Packard HP8491A**

3 Right-click the **Hewlett-Packard HP8491A** driver and choose **Properties**.

4 Click the **Reinstall Driver** button to display the **Upgrade Device Driver Wizard** and reinstall the driver using the *Agilent IO Libraries for Instrument Control* CD as the source of the driver files.

5 When you are finished, you should see an **Agilent E8491 1394 VXI controller** listed under **Test & Measurement devices**. At this point, IO Config should be able to find the E8491.

Windows 95/NT 4.0

If the E8491 does not show up on the left-side window, check the following (Note that the file locations are the default for Windows NT on IO Libraries revision H.01.03 or earlier. The directory names may be different if you are running a different OS, have a later version of the IO Libraries, or if you overrode the setup defaults).

1 Make sure the *\siclnt\intfcfg\cfg49132.dll* file exists. If it does not, re-run the setup utility and make sure you are installing E8491 support.

2 Make sure *c:\winnt\system32\wnpapi32.dll* exists (Windows NT 4.0) or *c:\windows\system\wnpapi32.dll* exists (Windows 95). If the file does not, re-run the setup utility and make sure you are installing E8491 support.

3 Run Explorer, and find the file *c:\siclnt\intfcfg\cfg49132.dll.* Right-click the filename, and select **Properties**. The property box that shows up should have a **Version** tab on it. If it does not, or if the version information on that tab appears corrupt, the file is probably corrupt. Delete it and then rerun the setup utility.

4. Run Explorer, and find the *c:\winnt\system32\wnpapi32.dll* file. Right-click the filename and select **Properties**. The property box that is displayed should have a **Version** tab on it. If it does not or if the version information on that tab appears corrupt, the file is probably corrupt. Delete it and then rerun the setup utility.

5. For a Windows NT system, go to Step 6. For a Windows 95 system, go to Step 7.

6. **Windows NT:** Click **Start** | **Settings** | **Control Panel** | **Devices**. Find the **wn1394 Device** and make sure it is started. If it is not, try starting it by selecting the **Start** button. The E8491A is normally set to startup **Automatic** and the **HW Profiles...** selection should indicate that it is **Enabled**.

7. **Windows 95:** Check the device manager to ensure that the driver for the IEEE-1394 PCI card was installed correctly. To do this:

   a. Click **Start** | **Settings** | **Control Panel**.

   b. In Control Panel, double-click the **System** icon. When the **System Properties** dialog box appears, select the **Device Manager** tab.

   c. You should see an item called **1394 Bus Controller**. If you do, double-click it to expand it. You should see a 1394 controller listed from HP with no exclamation points on it. If you see an exclamation point, try selecting it, press **Remove** and then press **Refresh**.

   d. After a moment, Windows 95 should ask for a driver. You can use the *Agilent IO Libraries for Instrument Control* CD as the installation disk when it asks for a disk. If you do not see the **1394 Bus Controller** icon, the IEEE-1394 card may be listed under **Other devices**. If the IEEE-1394 card is listed there, remove thie listing and then click **Refresh**.

PC Locks up After Installation

If your computer locks up or freezes after installing:

1. Make sure the power cable is connected to your PCI card.

2. If you have installed the operating system using a disk copy or imaging utility instead of the standard install, make sure that the operating system image is compatible with your computer. We have seen instances where these images are not compatible, and can cause hangs on boot or driver software not loading properly.

3. Upgrade your system BIOS (NOTE: even new computers may have a newer BIOS available!)
4. Upgrade your video drivers
5. Upgrade your LAN drivers
6. Upgrade your IDE and/or SCSI drivers
7. Upgrade your Sound drivers
8. Make sure the PCI BIOS is set correctly:
   a. If you are running Windows 95, set to **Running Windows 95** or to **Plug&Play OS**.
   b. If you are running Windows NT, set to **Running Windows NT** or to **Not Plug&Play OS**.
9. Make sure the PCI host adapter card is installed in a PCI bus-mastering PCI slot.
10. Configure your PC so as to not share IRQ lines. Many PCI cards have bugs when sharing IRQ lines. You may or may not be able to do this on all PCs. However, many PCs can be configured using the setup option when the PC is first booting.

NOTE

If you are having performance problems on Windows 95, disable power management (Control Panel, Power-icon) and remove USB supplement (use Control Panel, Add/Remove programs).

Using the E8491 With a Laptop PC

If you want to use the E8491 with a laptop computer, Agilent recommends you take the following steps.

> **NOTE**
>
> *Agilent has tested the E8491 with the Gateway Solo 9300 series and have qualified Windows NT 4.0 and Windows 2000.*

1. You will need to purchase a special 6-pin to 4-pin IEEE-1394 cable. The 6-pin to 6-pin cable shipped with the E8491 will not plug in to the 4-pin connector on the laptop. These cables are available at most discount computer stores.

2. *Before* installing the IO Libraries, if you are running Windows NT 4.0, you will need to install the latest service pack for NT 4.0, at least Service Pack 5.

3. Some earlier Gateway laptops had some driver problems. If your computer freezes when running the IO Libraries Setup utility:

   a. Reboot your laptop, enter the BIOS setup (press **F2** on boot), and verify that the **Installed O/S** is not **Other**.

   b. Install the Agilent IO Libraries. They will not work yet, because the BIOS is not set correctly.

   c. Click **Control Panel** | **Devices**. Find **wn1394**, click **Settings** and change to **System**.

   d. Reboot the PC and enter the BIOS setup screen by pressing **F2** as it is booting. Go to the **Advanced** menu and change the **Installed O/S** field to **Other**.

   e. This completes the setup. Connect the mainframe, run IO Config, configure the E8491 module, and start controlling instruments.

USB/GPIB (82357) Interface Troubleshooting

This section gives guidelines to troubleshoot the USB/GPIB (82357) interface, including:

- 82357 Will Not Work on Windows 98 Gold
- Windows 98 CD May be Required
- Using USB Scanners
- Attaching Unconfigured 82357s
- USB 1.1 Protocol Latency
- SRQ Delivery and Callback
- Running on Multi-CPU PCs
- Using USB Hubs
- Using Thread Priority

NOTE

See www.agilent.com/find/iolib_support for the latest information.

82357 Will Not Work on Windows 98 Gold

Users who install the Agilent IO Libraries onto Windows 98 Gold (first edition), will find that the 82357 will not function on that operating system (OS). If you have installed onto a Windows 98 system and find that all three of the 82357 LEDs are illuminated but the 82357 can not be configured, first verify that you are using Windows 98 SE (2nd edition). If you are not using Windows 98 SE, you must either upgrade to Windows 98 SE or change to one of the other supported Windows OSs.

Windows 98 CD May be Required

Windows 98 may require the insertion of the Windows 98 CD for installation of a Microsoft driver (*usbscan.sys*). If the location of the *usbscan.sys* driver cannot be provided (either by CD or another directory) and the user presses **Cancel**, the 82357 will not function.

After pressing **Cancel**, you must find the Windows 98 SE install media and then reinstall the driver for the 82357. This can be done through the Windows Device Manager while the 82357 is attached (select the **82357**, view **Properties**, select the **Driver** tab, click the **Update Driver...** button and follow instructions), or by uninstalling and reinstalling the Agilent IO libraries and then reattaching the 82357.

Using USB Scanners

Some USB scanners install in a manner that prohibits other devices from accessing the *usbscan.sys* driver. If you find that the 82357 does not function properly and you have a USB type scanner attached to your computer, unplug the scanner's USB cable and then re-attach the 82357 cable.

If you find that this allows the 82357 to function, your scanner is preventing access to the *usbscan.sys* driver. You may operate without the scanner attached or see the Agilent IO Libraries Support web page for ways to work around this problem.

Attaching Unconfigured 82357s

Attaching unconfigured 82357s to a computer that is not running will cause those devices to not be recognized by the system after booting. To get the system to recognize and configure them, unplug/replug the 82357 USB cable after the computer is running.

USB 1.1 Protocol Latency

USB 1.1 has an inherent 1msec protocol latency. The consequence of this on the implementation of the GPIB interface is that there is considerable overhead associated with even small-byte transfer operation, resulting in poorer small block transfer performance than other GPIB interface implementations. With large-block data transfers, the protocol overhead becomes negligible, allowing the 82357 to meet or exceed the majority of other GPIB interface products on the market.

SRQ Delivery and Callback

SRQ delivery performance may be as slow as 2 msec due to the USB 1.1 implementation of the 82357.

GPIB SRQ callback routines may be called more frequently than expected. Once an SRQ is asserted on the GPIB bus and an SRQ callback routine has been called, the 82357 driver periodically checks to verify that the SRQ has been serviced. If it has not been serviced (following a dwell period), the SRQ callbacks are called again.

This behavior ensures that race conditions between multiple devices asserting SRQs does not result in a missed SRQ callback when a second SRQ is asserted during the servicing of a previous SRQ. Your SRQ callback routines should be written with the expectation that they may be called multiple times if the SRQ is not serviced in a timely manner.

Running on Multi-CPU PCs

Some problems have been seen using the 82357 with USB 2.0 interfaces running on multi-CPU computers, where unexpectedly long delays in USB service have caused the 82357 to experience unexpected timeouts. This drop-out in USB service appears to be due to the underlying USB 2.0 drivers on the multi-cpu platform. The current workaround is to either operate the computer in Single CPU mode, or use the USB 1.1 interface normally built-in to most PCs.

Using USB Hubs

The 82357 is a bus-powered device and requires connection either directly to the host computer USB port or to a self-powered USB hub (a hub that has its own source of power). Internal testing has shown that some USB hubs are more vulnerable to electrostatic discharge problems than others.

If you find that are experiencing problems while using a USB hub, test your system while plugging directly into the host computer's USB port. Attachment directly to the host computer's USB port provides the best assurance against electrical interference/electrostatic discharge problems when using the 82357.

NOTE

Use of USB extension cables are strongly discouraged with the 82357. It compromises the power supply to the device and can lead to erratic behavior.

Using Thread Priority

Note for advanced users regarding thread priority. For the 82357 to function properly, it should not be starved for CPU time. Most user applications run at a normal default thread priority which will not cause any problem.

However, CPU intensive user applications that specifically elevate process/thread priorities above normal user priorities can create a situation where the 82357 driver will be starved for CPU time, resulting in unexpected timeouts on the 82357. We recommend that users not run high priority, CPU intensive processes when using the 82357.

LAN/GPIB (E5810/E2050) Troubleshooting

This section gives guidelines to troubleshoot LAN/GPIB (E5810/E2050) interfaces, including:

- Long Delays When Attempting to Open Devices
- Configuring VISA/SICL with the E2050

Long Delays When Attempting to Open Devices

If you are experiencing long delays (on the order of 2 minutes) when attempting to open LAN-based devices in VISA and SICL, you may not have your LAN configured properly for DHCP and DNS. If your computer is configured for DHCP, but there is no DHCP server available, the computer will attempt to contact the non-existent server for up to 150 seconds before timing out.

Similarly, if your computer is configured for DNS, but a DNS server is not available, you may see timeout delays when attempting to open an LAN device.

If you move your computer to a network without a DHCP and/or DNS server and you still experience delays, make sure you network configuration is correct and then reboot to make sure your computer is not attempting to use settings remembered from its original network connection.

Configuring VISA/SICL with the E2050

When configuring VISA/SICL with the E2050 LAN to GPIB Gateway:

1. In IO Config, you must first configure a LAN Client and remember the **SICL Interface Name**. Then, configure a VISA LAN Client as follows.
2. In the **LAN Client SICL Interface Name** field, enter the **SICL Interface Name** of the LAN Client you want your VISA LAN Client to use.
3. In the **Remote Hostname** field, enter either the IP Address or the LAN name of the E2050.
4. In the **Remote SICL Interface Name** field, enter the **hpib-name** as defined on the E2050. You can telnet to the E2050 to see what this name is. You must be able to ping and telnet to your E2050 or SICL and VISA will not work.

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